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ABSTRACT

Designed for teachers of students in grades 2 through 4, this teaching guide for a self-teaching, interdisciplinary reading and activity program comprises a complete supplemental reading, science, and social studies approach to the problems of environmental pollution. Jelly Jam, a caring little animal, helps children understand how air, water, and land pollution affect their lives and what they can do to help clean up the environment. The guide presents general background information; additional classroom and home activities, ideas, games, questions and answers, experiments, illustrations, and interdisciplinary projects; and the answers to questions and puzzles that are in the children's activity book. The guide is organized into the following sections: foreword and introduction, curriculum suggestions, and using the program: pollution and the environment, air pollution, water pollution, land pollution, population, and additional ideas. A list of recommended books, periodicals, films, records, and other materials for children and adults, the names and addresses of active environmental organizations, and a comprehensive index conclude the document. (LH)

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THE PEOPLE PRESERVER TEACHING GUIDE

by Judi Friedman

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I am deeply indebted to many people for their help and encouragement. Special thanks go to Don LaSalle of the Talcott Mountain Science Center in Avon, Connecticut, and to Ruth Maher, formerly of the Cherry Brook School in Canton, Connecticut, whose fine teaching was equaled only by her understanding of young children.

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Judi Friedman

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Jelly Jam

THE PEOPLE PRESERVER

TEACHING GUIDE

by Judi Friedman

An Environmental Manual
for Teachers and Parents

United States Edition

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Thank you for caring enough about the world and its children to read and teach Jelly Jam, The People Preserver.

FOREWORD

"Our environment today is likened to an eccentrically tailored cloak which enfolds all--but fits few. It binds a bit here and chafes there, impairing the circulation and causing widespread irritation. The seams are frayed. Threadbare patches need reweaving, stains need removing. But the fabric of this universal cloak still has plenty of wear in it, which is a good thing because it is the only one we have. It won't last forever in a conscionable state, however, unless it stops being torn, trampled, and cast into the corner. Our environment urgently needs restyling, mending, and sprucing up."

The preceding analogy, originally postulated at a conference of the National Association of Home Builders in 1965, reverberates even more loudly today. Let us hope it will not continue to fall upon deaf ears. But how do we go about evaluating the work to be done? To achieve what ends? To preserve what values? To create which new ones? The author of Jelly Jam has grasped a fresh new approach to some of these nagging problems by tackling them head on in a positive and novel manner for young children.

Through the guidance of a lovable but imaginary cartoon character, she offers young people and their parents and teachers alike alternatives to the doomsday epitaphs confronting us daily in all the media. By attempting to build positive values instead of utilizing shock tactics, children are carefully led through a series of well-thought-out and interesting activities which build sound understandings of the environmental cloak surrounding them.

Donald P. LaSalle, Director
Talcott Mountain Science Center
Avon, Connecticut

INTRODUCTION

The purpose of this manual and its accompanying materials is to bring the problems of the pollution of our environment to young children and to offer them some real solutions that they can undertake at their own level. While some of the points may seem minor to adults, to children they are concepts and activities with which they can cope.

Although some people may be reluctant to present the weighty problems of pollution to young children, they deserve such knowledge. It is their world, too. They have an even greater stake in the earth's future than do adults. It is they who must live with the problems of pollution that are being created today. Because children consume more air, food, and water relative to their body weight than do adults, their intake of pollutants is also greater. Interested children hopefully will communicate their questions, interests, and solutions to the adults in their world.

We adults have an obligation to help children find ways to combat environmental degradation. Television messages, movies, and magazine articles on pollution may serve only to frustrate the concerned youngster because these messages usually do not offer solutions.

There are few better ways to get students involved in their studies than to have them investigate a subject that affects their everyday lives. Jelly Jam, The People Preserver, is a relevant topic.

Environmental conservation is usually most desired by people who appreciate the natural environment. Therefore, to instill the love for all living things and the love of a healthy body are ways to build a framework for teaching about pollution.

What Jelly Jam may accomplish when used enthusiastically is best described by Mrs. Ruth Maher, a former second grade teacher at the Cherry Brook School in Canton, Connecticut. She has used Jelly Jam extensively and creatively with her students. The letter from Mrs. Maher to the author is reproduced on the next page at the suggestion of the publisher because it is the clearest and most detailed description available of the many things that Jelly Jam can accomplish when the program is fully used.

Dear Judi,

I'm sincerely grateful to you for giving me an early introduction to Jelly Jam and letting me use the book with my second graders. Jelly Jam fills a long-standing need for materials to develop environmental concern where it is most vitally needed--among the young. The Teaching Guide is an invaluable reference! Thank you for making so readily available the results of what must have been a tremendous task of research and analysis.

Happily for the children, Jelly Jam's emphasis is positive--We can clean up much of the damage already done; we can prevent further destruction of air, water, land and life itself; every one of us can help. Jelly Jam sharpens our awareness and appreciation of beauty. He leads us to greater understanding of nature's delicate balance and our own responsibility to protect the environment.

For the past two years Jelly Jam has been a kind of teacher's aid in my classroom. His simple stuffed-toy form and flexibility are very appealing. He demonstrates personal interest in the welfare of every living thing, and the children quickly recognize him as their crusader. He doesn't threaten or preach; he leads; he pleads; his expression and posture indicate joy and gratitude whenever he sees evidence of cleanliness, health and beauty. Even the least skillful young artist can produce pictures or models of Jelly Jam, who thus becomes the child's own creation and a source of pride.

Jelly Jam has helped inspire cleanup, conservation and recycling campaigns, and since Jelly Jam is always with us, he doesn't let these efforts become one-time projects. Preventing litter and recycling waste have become routine habit with many families whose children have come under Jelly Jam's spell.

At first some parents complained when their children objected to frequent use of fireplaces and excessive consumption of electricity, paper and plastic. Now, however, when my children bring notes from home they are often written on tiny scraps of paper, sometimes even on the back of paper that has previously been used for some other purpose.

By using our individual chalkboards we save at least two hundred fifty pounds of school paper each year, and the chalkboards are fun to use! One reason for their popularity may be that mistakes are so easily erased and corrected. We have found many, many uses for our chalkboards, which involved an expenditure of only about fifteen dollars and a few messy hours of painting.

Posters, mobiles, bulletin board displays, "junk art" projects, nature walks and participation in setting up a nature trail, creative writing, news gathering, weather watching, graphs of nepholometer ratings and the weight of daily lunchroom waste, map study, scientific observations and experiments--these are just some of the activities in which Jelly Jam has engaged us. After a heavy rain we even rescue the earthworms that have become stranded on amesite and concrete surfaces. We carefully pick them up and place them in grassy areas where they quickly burrow into the soil. Hopefully, after exposure to Jelly Jam, we will always retain our respect for all links in the life chain. Long live Jelly Jam!

Sincerely yours,

Ruth D. Maher

CURRICULUM SUGGESTIONS

Suggestions for Use of the Activity Book

The Jelly Jam Activity Book is suited for use by teachers, parents, nature center teachers, children's group leaders such as Scouts and 4H personnel.

Some of its special qualities are:

... The subject matter appeals to children in grades 1 through 5.

... No unusual equipment is required for most of the projects, activities, and experiments; therefore, it can be used by adults outside the classroom as well as in the the classroom.

... An individual child and his/her teacher or parent can use the Activity Book and Teaching Guide just as effectively as can a group.

... A group of children or a class of children may work on The Jelly Jam Activity Book as a total group/class project. Individual students may work on it in varying depths and at varying speeds within the group.

... The Activity Book answers are located in the back of the Activity Book. They can be further illuminated by the short background reading associated with each page in the child's book. The answers may be removed if desired.

... An in-depth study following all the suggestions in the Activity Book and the Teaching Guide could be the basis for a total year's work or could be accomplished in several months' concentrated effort. Adults with limited time can break the book into sections as detailed in the Guide.

... New word lists are located in the back of the book.

... Most of the pages contain some kind of activity that emphasizes the ability to follow directions.

... Creative tests of comprehension are placed at the end of most sections as well as in other areas of the Activity Book.

... Games and puzzles include perceptual activities.

For classroom teachers and other teachers:

... A teacher may use a regular daily period for the program.

... As part of an elementary reading program:
It provides excellent opportunity for unlocking new words.
Difficult words are ones that children reading on a 3-1 level or below may find confusing.
During reading periods it can also be used as a special reading book. This relevant material offers the reader an interesting and constructive break in daily routines.

... As part of an elementary science program:
Following studies of such topics as plants, animals, and air, the book would emphasize current problems on the fragile "Spaceship Earth."

... As part of an elementary social studies program:
Jelly Jam provides a current theme of environmental problems examining the social, economic, historical, and political causes and effects.

A population study, for instance, becomes even more poignant when the pollution problem is comprehended. The role of lawmakers and the responsibility of citizens can be clearly illustrated by examining a specific environmental problem. Daily examples can be gleaned from local newspapers. A study of the American Indian gains new emphasis when the environmental perspective of the Indian is understood.

However the book is used, it provides for an interdisciplinary experience. The interrelationships among subject areas are often lost on most students. They tend to see social studies as separate from science, science separate from math, math unrelated to music, etc. By studying a specific problem such as the pollution of the environment, students can work on a broad spectrum of curriculum subjects including art, music, and health.

Jelly Jam should be a creative project of each child and can be enjoyed as an independent personal study. It should become his/her own book. The child should be allowed to write in it, color in it, and even add any relevant pictures that interest him/her. Jelly Jam represents caring, and caring has no special color or sex.

General Teaching Suggestions

1. It is important that children realize that we cannot run away or hide from environmental problems. We cannot "buy our way out." Our problems bind us all together--rich and poor, black, yellow, red, and white. Only when each of us works together in each town, watershed, city, state, region, and nation, can we find solutions.

Peace between all people is primary. The greatest threat to our environment is war. Nuclear war, the ultimate pollution, would destroy the earth as we know it.

2. Healthy, environmental choices are largely the result of common sense. If a product has been used successfully and safely by many people for generations, it is probably a good choice. For instance, glass has been proven to be safe for food storage.

However, new products or techniques should be questioned by the consumer even if they are initially supported by the government. There are about 55,000 chemicals on the market now, and up to 1,000 new ones are introduced each year. Two examples of government-approved products that have been declared unsafe are acrylonitrile (a plastic that was used in food containers) and foam insulation with formaldehyde in it.[1]

Thoughtful environmental choices will be the survival techniques of the 80's and 90's.

3. Jelly Jam is a book about balances. Life on earth is a delicate balance between many types of organisms and non-living resources--the air, the oceans, and the solid earth. Each creature on earth affects and is influenced by the earth's balances. A change in one means a change for all.

Earth's many balances have always undergone change and adjustment. Recently, however, humans have gained the technological tools to cause great and sudden changes in the earth's balance and to upset it in catastrophic ways.

The concept of balance may help students to understand why certain practices and materials threaten the environment and may help them to choose appropriate solutions to environmental problems.

4. Teaching environmentally means teaching the interrelationships of all things. The bee is related to the apple we eat. Most children have no idea that if all bees died, most fruits and vegetables would not exist.

In the late 1800's Francis Thompson wrote:

---

[1]"They Kill Mice, Don't They?", The Progressive, February, 1982, p. 7.

Near or far
Hiddenly
To each other linked are
That thou canst not stir a flower
Without troubling a star.

5. Encourage the simplification of lifestyles with less emphasis on material goods and services. Help children to understand the differences between their "needs" and their "wants." Discuss what can happen to people when they acquire everything that they want. Their spirit is inhibited; repair and care of possessions saps energy.

It is the quality of life rather than the quantity of things possessed that will result in inner peace and a reduction of pollution in our western society.

6. Helping children to solve environmental problems in the most significant way cannot take place successfully in an authoritarian classroom or home environment. An authoritarian environment does not lend itself to individual responsibility. It is important that the children feel that they have some power. If children have the sense that they can effect some change now, they are more likely to become active rather than passive citizens in the future.

7. Above all, fear must never be used as a tool. Its use may engender hopelessness and a feeling of futility. Change sometimes comes through one person at a time; if each child can light "just one candle," there is hope. To learn more about change taking place, tell the children about Ghandi and his ideas that changed the entire political control of India.

8. The children may also be interested that pollution is a world problem. Air pollution from household and factory coal burning contributed to causing the fogs which killed hundreds of people in London. Major cities in China have air pollution levels that are seven times greater than the safety levels set by the World Health Organization. All over the world groups of people are forming and working to solve environmental problems.

9. World environmental problems cannot be solved as long as people are desperately poor. Resource depletion will occur as long as people live only for their present survival. Teaching the poor to help themselves will also improve the environment. Discuss what the children might do to help solve the problem of poverty, such as giving money to WHO, UNICEF, CARE, Bread for the World, etc. Writing letters to legislators is also extremely important. (See this Guide, page 91.)

10. Lastly, although the ideas in Jelly Jam may seem mature to the adult, today's children must deal with such ideas as they contend daily with television and its adult thoughts. Children can understand any idea provided they understand the vocabulary

that explains that idea. Armed with understanding, children can think and act positively.

Specific Teaching Suggestions

1. Prepare the children for the Jelly Jam Activity Book by teaching them something about ecology. Set up a controlled environment such as a fish tank or a terrarium. Discuss the components of a suitable environment: food, water, oxygen, carbon dioxide, heat, and light. Discuss what would happen if one of these components was removed or changed radically; i.e., no heat or sunlight. Compare the situation to our environment. What would happen to growing plants if too much smog obscured the sunlight for weeks?

2. Divide a small piece of outdoor school property into squares. Encourage each child to observe one of the squares for an entire school year. Record the changes that occur and discover who lives in the square, what happens, and how everything is interdependent.

3. During each season of the year, spend a day with your child or children in a park or forest. If possible, encourage the children to take camping trips with someone who enjoys camping. Let them feel the immediate power of the natural world without man-made comforts that tend to lull them into thinking that nature is secondary to and under the control of man. Encourage children to be part of nature. Discourage the idea of "conquering the wilds."

4. Find out what each child values most in the natural world: swimming, fishing, observing flowers or common insects, eating fresh ber-

ries and fruit, feeding birds, enjoying natural sports such as canoeing, hiking, etc.

Perhaps many children do not realize that even to play sports well one must have plenty of oxygen to breathe. Polluted air may interfere with the ability to use oxygen. Have the children find out what pollution can do to the aspect of nature that they most value. After discussing their thoughts, they might like to illustrate them.

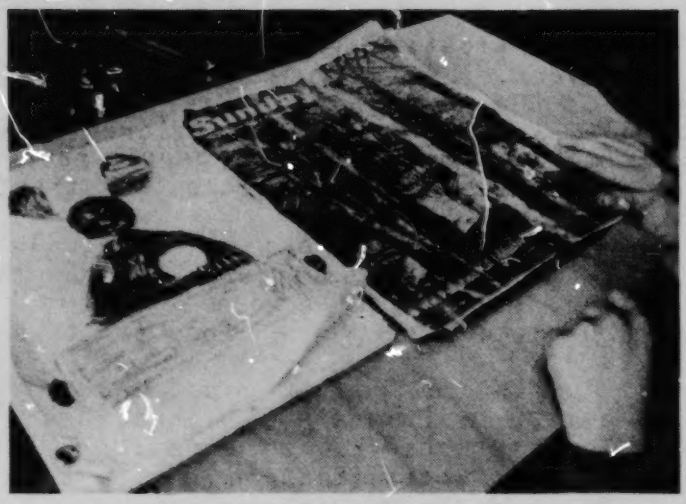
5. Examine your home and school for their contribution to the pollution problem. Are they overheated? Are outside doors weatherstripped? Are storm windows used? Are there leaky faucets in the bathroom or kitchen? Can the water temperature be lowered? Are unnecessary lights left on in the classrooms, hallways, offices, faculty lounge, or cafeteria? Can recycled paper be used? Does the business office consider the environment when purchasing cleaners and detergents? Can the food needs of children be met more safely and healthfully? Can some of the classroom, home, and luncheon waste be eliminated? Do art supplies contain dangerous chemicals or asbestos? Is there any natural area for firsthand science study such as a nearby park or graveyard?

6. Whenever possible, weigh solutions to environmental problems. Often there is no perfect answer. However, one alternative may be preferable to another. For instance, a controversy raged over the use of glass bottles for milk as opposed to paper containers. Glass can be reused, but the chemicals and the water consumed in the washing process may make glass an imperfect alternative to biodegradable paper cartons. These problems are excellent subjects for role-playing. (See page 90 of the Teaching Guide.)

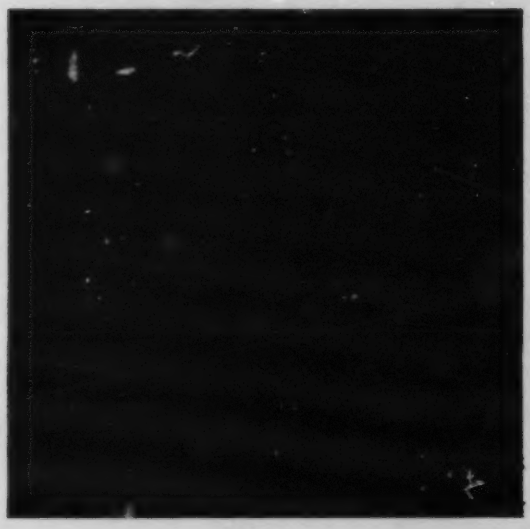
7. Encourage the children to become more aware of articles in newspapers and magazines that concern the environment. Analyze ads from an environmental point of view. Some advertisements actually promote the destruction of the environment.

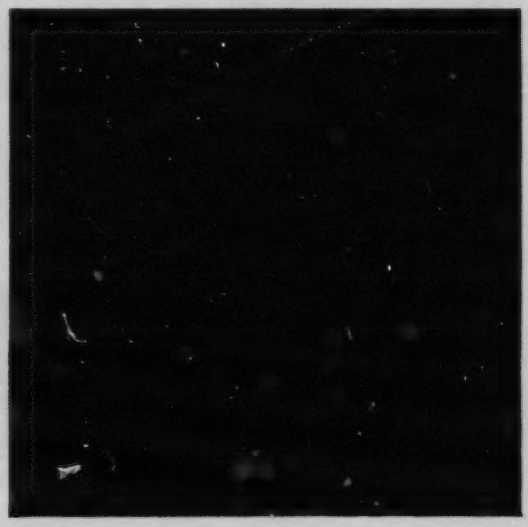
8. Join a conservation organization at school and/or at home. (See this Guide, pages 103 and 106.) Groups of people working together in an organized manner can often exert more influence than an individual working alone. Also, the group spirit may help buoy up the members.

9. In conjunction with their study of Jelly Jam, the children may want to make two scrapbooks: one about pollution, the other about solutions. Articles from magazines and newspapers, pollution indexes, science experiment summaries, original games, and puzzles could fill 20 pages or more.



10. Have a school or scout poster contest. Use the posters as advertising for a class, school, or scout anti-pollution meeting. Ask local merchants to display the posters. Ask parents to attend the meeting.





11. Make school bulletin board displays of products that are environmentally safe. This list changes from time to time as new products appear on the market. A list of books about safe products is on page 58 of this Guide.

12. Ask your community and school librarian to purchase and display current books and periodicals on nature, the environment, and pollution. Some of the books should relate closely to the community in which the children live. A book on seagulls would

be interesting for children living near the seacoast or large rivers. (See pages 99-102 of this Guide for suggestions.)

13. Encourage the children to make a historical study of the American Indian. These people respected the earth and all of its components, and therefore they treated the earth with care.

"The old Lakota was wise. He knew that man's heart away from nature becomes hard; he knew that lack of respect for growing, living things soon led to lack of respect for humans, too. So he kept his youth close to its softening influence."[2]

14. Jelly Jam pins are available from the publisher. Their purpose is to engender group identification with Jelly Jam and his pro-people philosophy. Wearing the button is one way to show a public commitment on the part of each student to the environmental movement.

[2] Touch the Earth, T.C. McLuhan, ed., N.Y.: Simon and Schuster, 1971, p. 6.

USING THE PROGRAM

ACTIVITY BOOK COVER

Tear out the answer sheets if you do not want this activity book to be self-teaching.

After you distribute the books and while the children are still examining the book cover, introduce the words:

preserver
environment

Write these new words on the board while the students are looking through the book. Ask the children what Jelly Jam is probably trying to do.

Explain that a preserver is "one who keeps, guards, keeps safe from injury, harm or destruction," according to Webster's Dictionary. Ask the children what a life preserver is.

Discuss the word environment, which means "All the factors that act on an organism or ecological community and ultimately determine its form and survival." (Webster) Discuss the children's environment and what they need to live and grow.

Ask the children how this imaginary creature, Jelly Jam, might help teach us to live safely in our environment.

Put up Poster 1 if you have purchased one. It is a classroom introduction.

PART ONE: INTRODUCTION

ACTIVITY BOOK: PAGES 1, 2

Word to Introduce

introduction - the beginning.

General Information

Explain that all new words are printed in dark type and are explained on pages 62, 63, and 64 of the Activity Book.

Ask the children to read silently and to follow directions.

Answer

Tears should be falling to the ground.

ACTIVITY BOOK: PAGES 3, 4

Word to Introduce

polluting (pollute and pollution) - Polluting means to make dirty.

General Information

Discuss with the children how the air in their local community is being polluted by exhaust from cars and trucks, sprays, smoke and gases from heating units and factories, and chemicals from many sources.

The water is being polluted with poisons leaking from toxic waste dumps, chemical run-off from sprays, waste from homes and factories, and with litter and oil. Even the painting and cleaning products we pour down our sink drains go into water sources.

The land is being littered with trash, poisoned with chemicals, and covered with asphalt and concrete buildings.

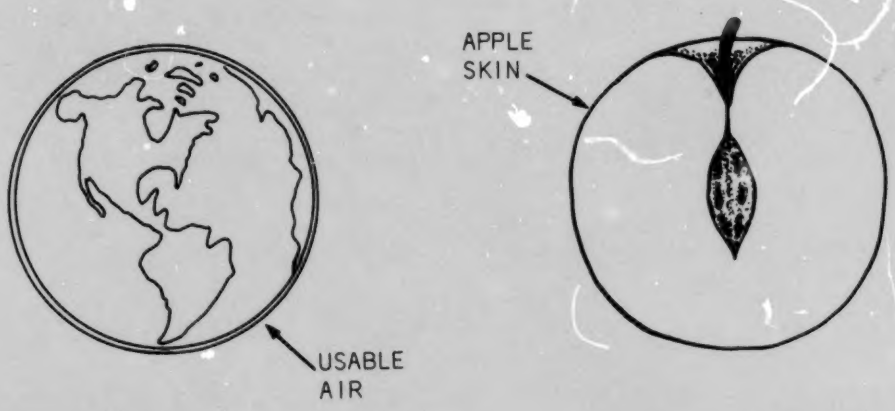
Explain to the children that everyone pollutes the environment to some extent. Many people may be very ignorant about their own polluting, such as: littering, not tuning cars, burning trash, using dangerous cleaning products, and spraying with chemicals. Be sure that children do not feel guilty about their parents' jobs. Some parents do not understand how they may be destroying some part of the environment; others may not feel they have a choice because they need the income to survive.

Also discuss how some people use many more resources than others by driving their cars often, living in several homes, eating too much, etc.

Discuss why people who respect nature and who realize that man needs clean air, water, and land to be healthy in body and mind seem to care most about the environment.

Adults breathe in about 35 pounds of air a day. Have the children try to lift something that weighs about 35 pounds.

Most resources such as air are limited. Our limited air supply around the earth can be compared to the skin on an apple. Bring in an apple and halve it. The air that our bodies can use is a very thin layer like the apple skin.



Tell the children that there are also finite amounts of other resources on our planet: water, soil, oil, coal, iron ore, etc.

Explain that our water is used over and over again.

Discuss with the children what we will do when we run out of oil. Energy produced by coal and nuclear plants presents many problems. We may use other safer renewable resources to produce energy, such as wood, wind, solar, steam through a magnetic field, geothermal energy, and even garbage. It would be best to use these renewable resources before we run out of non-renewable ones.

Ask the children what will happen if we run out of clean air and water.

We will no longer be able to live. There are no substitutes for clean air and water.

Answers

On page 3 the word "Yes" should be checked. Everyone (including teachers) pollutes the environment to some degree.

On page 4 circles should be drawn around the car, the factory, and the home.

Books for Primary Grades

Breiter, Herta. Pollution, Milwaukee: Raintree Children's Books, 1978. (This is a small, interesting book with excellent colored illustrations for grades 2-5.)

Feet, Bill, The Wump World, Boston: Houghton Mifflin, 1970. (This cleverly illustrated book describes the beautiful world of the wumps which is ruined by pollution. The wumps go underground until the pollution-makers leave.)

Seuss, Dr., The Lorax, New York: Random House, 1971. (This book is a Seuss favorite about excesses that result in pollution.)

Books for Intermediate Grades

Hoke, John, Ecology: Man's Effects on His Environment and Its Mechanisms, New York: Franklin Watts, Inc., 1971.

Simon, Seymour, Science Projects in Pollution, New York: Holiday House, 1972. (Outstanding experiments in pollution. Excellent teacher resource.)

Books for Adults

Bixby, William, A World You Can Live In, New York: David McKay Co., 1971. (This children's book is wonderful for adults who want to talk to children about the environment.)

Croall, Stephen, Ecology for Beginners, New York: Random House, Inc., 1982. (This paperback is a not-so-beginning "comic style" book with a historical perspective.)

ACTIVITY BOOK PAGE 5

Words to introduce:

geranium - a plant with large red, pink, or white flowers on it. The leaves have many rounded edges.

vinegar - a sour-tasting liquid used in cooking. It has a strong smell.

acid - something that is sour and makes a special blue paper called litmus turn red.

oil - a greasy liquid that will not mix with water.

Experiment: Changing the Environment.

What is the result when a plant's environment is polluted?

Directions: This experiment can be done individually or in groups. Results may be recorded on page 5 of the activity book after one week. Daily observations and a final summary may be entered in the scrapbooks.

Materials: For each experiment, the following items will be needed:

4 cuttings from any houseplant such as a geranium, begonia, or philodendron
4 glasses of water
4 labels
A tablespoon
Vinegar
Salt
Any household oil

Questions for the Children

1. What does the cutting need in order to live for several weeks? (It needs clean water and air, warm temperature, and light. To live for a long time it would need food.)

2. What do humans need in order to live? (They need clean water and air, warm temperature, and healthful food.)

3. What do you think will happen if the plants' environments are polluted? (They may become sick and die.)

4. What is one important reason that the vinegar, salt, and oil are not good for the plants? (There is too much of each substance. Pollution is partly the result of quantity.)

5. In what ways are these pollutants like real pollution in our environment? (The leaf in salt may show some white salt on it. All 3 polluted cuttings will eventually wither.

The acidic leaves show the most dramatic change and will wilt the soonest. This observation may effectively trigger a discussion of acid rain.

Because the oil does not mix rapidly with the water, the cutting in oil is the least affected.

These "pollutants" create somewhat realistic situations. The acid vinegar is not unlike the acidic pollutant from smoke stacks--sulfur dioxide--which, when combined with rain water, becomes weak sulfuric acid. The floating oil is reminiscent of oil spills. The salt is similar to materials put on icy roads to make ice melt. This substance sometimes damages roadside plants; it also gets into wells and reservoirs and affects people's drinking water.)

Answer

The leaf in the glass of water should be circled. All the leaves should be colored.

PART TWO: AIR POLLUTION

General Information

Much of this material can be used individually or in groups rather than with the whole class. Students may need help with pages 10, 12, 17, and 21 and with the experiment on page 13. Experiments could be assigned to various groups, done at home, or demonstrated in class. A crossword puzzle completes the unit. It is a self-correcting test on vocabulary and comprehension.

However, greater understanding and stimulation will come from the sharing of information and the creative interplay between students and teacher or child and parents through discussion about the vocabulary and activity on most pages.

ACTIVITY BOOK PAGE 6

Words to Introduce

oxygen - a gas that has no color or smell. One-fifth of the air is oxygen. Be sure children understand that only one-fifth of the 35 pounds of air that an adult takes in each day is used. People can use only the oxygen in the air.

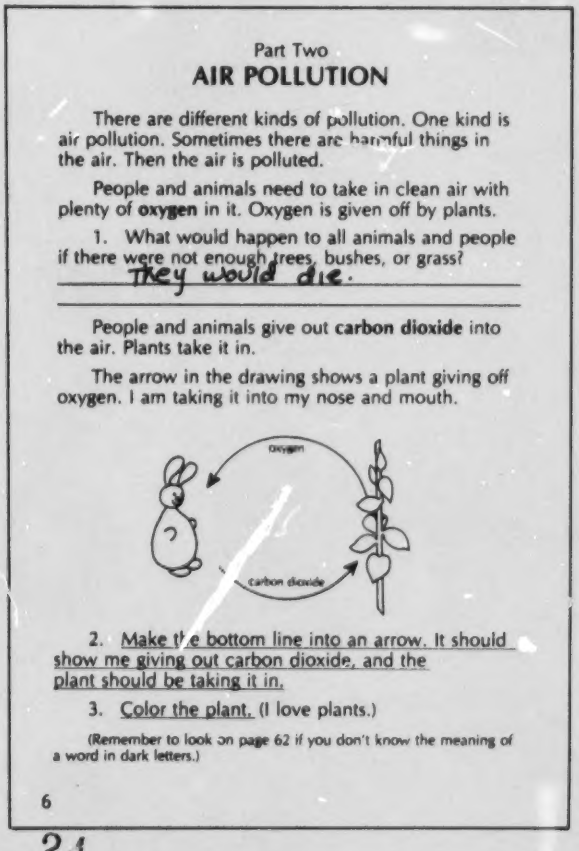
carbon dioxide - a gas in which things will not burn; it is made of carbon and oxygen.

Answers

1. If there were no more trees, bushes, grass, or other green plants, there would not be an oxygen supply. People cannot live without oxygen. They would die.

2. The arrows should look as they do in the reduction of page 6.

3. The plant should be colored.



Part Two

AIR POLLUTION

There are different kinds of pollution. One kind is air pollution. Sometimes there are harmful things in the air. Then the air is polluted.

People and animals need to take in clean air with plenty of **oxygen** in it. Oxygen is given off by plants.

1. What would happen to all animals and people if there were not enough trees, bushes, or grass?

They would die.

People and animals give out **carbon dioxide** into the air. Plants take it in.

The arrow in the drawing shows a plant giving off oxygen. I am taking it into my nose and mouth.

2. Make the bottom line into an arrow. It should show me giving out carbon dioxide, and the plant should be taking it in.

3. Color the plant. (I love plants.)

(Remember to look on page 62 if you don't know the meaning of a word in dark letters.)

6

ACTIVITY BOOK PAGE 7

Words to Introduce

Kleenex - soft, thin paper. People blow their noses in it.

magnifying - making things look larger.

General Information

This experiment can be performed in several different locations such as a school, home, parking lot, a parent's place of work, near a smokestack, or near a busy highway. Using an index card may be more practical than using Kleenex.

Comparisons can be made of the quantity of particulate matter and the reasons for the differences.

The students' hypotheses can be recorded in their scrapbooks along with their observations.

Answers

After two days, most pupils will see black specks on their tissue. Explain that these tiny bits of dust or liquid are produced by industrial processes and combustion. Each speck may be coated with toxic (poisonous) substances.

Question for the Children

What other ways can you tell if the air is dirty? (Look at the snow. It is dirtiest near roads and factories.

If you ever fly in a plane, you can often see air pollution that hovers over most of the major cities of our country. It is yellow brown.

You can listen to the radio, watch the weather news on television, or check the weather section in the newspaper. Sometimes pollution reports are given.)

Experiment: Observing Particulate Pollution

Another experiment involves a microscope and a slide with a drop of oil on it. Leave the slide outdoors for 4 hours. Examine it under a microscope and compare it with a clean drop of oil.

Activity (science)

As an air pollution study over the range of the school district, index cards with butter on them can be placed near busy highways and smokestacks.

Books for Primary Grades

Gutnik, Martin, Ecology and Pollution/Air, Chicago: Children's Press, 1973. (Four experiments on man-made air pollution are described in this interesting book.)

Books for Intermediate Grades:

Elliott, Sarah, Our Dirty Air, N.Y.: Julian Messner, 1971. (The main causes of air pollution and what to do about them are discussed in this text.)

ACTIVITY BOOK PAGE 8

Word to Introduce

gases - things that are not solid or liquid. They move around easily and do not have a shape. Air is made up of different gases.

General Information

The major man-made air pollutants are:

1. carbon monoxide - from incomplete combustion of carbon-containing material.
2. nitrogen oxides - from utilities and engines.
3. sulfur oxides - from burning fossil fuels containing sulfur.
4. vinyl chloride - a colorless gas used to make plastics.
5. hydrocarbons - from incompletely burned fuel.
6. lead - from engines burning gasoline containing lead additives.
7. photochemical smog - from the action of the sun on car exhaust.
8. cadmium - released into the air through the smelting and burning of plastics.
9. mercury - released from mining, used as a fungicide in agriculture or in the paint and paper industries.
10. beryllium - used as a moderator in atomic reactors.
11. fluorides - from industry.
12. benzene - organic solvent used in manufacturing.
13. arsenic - found in manufactured products such as chemicals, metals, and foodstuffs.
14. asbestos - used in old insulation, brake linings, heat shields.
15. radionuclides - products of nuclear reactors and arms manufacture.

Our air is primarily polluted by man-made activity. The weather conditions affect the potential danger of these pollutants. Unfortunately, air quality standards are set for healthy adults, not for children or senior citizens.

Rainfall in the United States and Canada is becoming increasingly acidic, killing all the fish in thousands of lakes and streams, damaging delicate soil chemistry and, therefore, crop and forest land. Acid rain occurs when sulfur dioxides and nitrogen oxides from the combustion of fossil fuels get into the upper atmosphere and combine with the cloud moisture.

Answers

A smile should be on Jelly Jam's face.

An X should show the approximate location of the child's home.

Questions for the Children

1. Why should we not complain about rainy or snowy days? (Rain and snow clean the air.

Unfortunately, pollutants in the air then cause the rain water to become acidic in some areas.

This map shows the extent to which our lakes and streams have been or are likely to be injured by acid rain.[3])

2. Why is acid rain a problem in some places and not in others? (Certain soils, certain weather patterns, and certain types of plants are more sensitive to acidity than others. Also, there are more polluting factories in some places than others.)

3. What can we do about our air pollution problems? (Talk to other people about them; join state lung associations; write our congresspersons, our President, and the Environmental Protection Agency. Unfortunately, most lawmakers do not know that standards are not based on children's bodies.)

---

[3]Credit: National Resources Defense Council, "ACID RAIN ACTION PROJECT."

ACTIVITY BOOK PAGE 9

Words to Introduce

lungs - parts of the body inside the chest that take in oxygen from the air and let out carbon dioxide.

lung cancer - a sickness during which parts of the lungs do not grow in the correct way.

emphysema - a sickness of the lungs which keeps people from breathing well.

dizziness - a feeling of going around in circles.

coughing - to blow air out suddenly from the lungs; to clear the throat.

sore - hurting

Answer

Jelly Jam should look like this:

ACTIVITY BOOK PAGE 10

Answers

The pupils may have marked:

- the head (headaches, dizziness)
- the eyes (sore and irritated)
- the nose (nasal discharge, shortness of breath)
- the mouth and throat (coughing)
- the chest and lungs (pains because of constricted air passages)

Put an X on each part of this woman that might be harmed by taking in polluted air often. Look at page nine for ideas.

Question for the Children

Why is it not a good idea to jog near a crowded highway during "rush hour"? (There are more pollutants in the air at that time of day. The jogger breathes them in deeply.)

Put up Poster 4. It shows healthy and damaged lungs.

ACTIVITY BOOK PAGE 11

Words to Introduce

poisons - things that can make you sick or kill you.

smog - smoke and fog mixed together.

General Information

Cars emit carbon monoxide. This poisonous gas drives out the oxygen in our blood. A small amount taken into the body can cause dizziness, headaches, and fatigue. A large amount of carbon monoxide can be fatal.

It can also slow driving reactions. Cars also emit benzopyrene (a cancer agent), nitrogen dioxide (which causes chronic lung changes), and lead (a well-known poison).

Answer:

The air should look light brown.

Experiment: Exhaust Particles

Can one see car exhaust?

The following interesting, but controversial, experiment can be performed at the discretion of the teacher. It reveals the incomplete burning of fuel in the auto, but it can be dangerous if a child does it without adequate supervision.

Tie a white sock to the exhaust pipe of a car or bus. Run the motor for 60 seconds. The material on the sock is part of what we inhale.

Questions for the Children

1. Why is this experiment very dangerous? (The fumes of carbon monoxide can kill living things, and the heat can cause burns.)

2. What is the black deposit on the sock? (Particles of carbon)

3. What do you think caused the black deposit? (The burning of the fuel was not complete.)

4. Why is it harmful to breathe this material and the dangerous unseen gases that accompany it? (The small, solid particles cause lung irritation which can lead to illness. Too much carbon monoxide will produce dizziness, fatigue, and headache symptoms. An overdose can be fatal.)

ACTIVITY BOOK PAGE 12

General Information

Many American families have one or more cars. As the children in these families mature, they may also acquire cars. By the time they move into their own apartment or house, they often already own at least one car. There are millions of families--all with cars--all sending poisonous gases into the air. In the United States the number of motor vehicles has increased twice as fast as the number of people in recent years.

Interestingly, some people are choosing not to have cars, relying on public transportation, bikes, and car pools. They save insurance, repair, and gasoline costs and do not make as much air pollution when they travel.

More cars need more highways. Road building upsets the ecology of many areas, limits desperately needed open space, and endangers oxygen-producing trees and other plants. As more and more tax money is used to build new roads and repair old ones instead of creating other kinds of public transportation system, people continue to look to the car as their only practical means of transportation. A vicious cycle is perpetuated.

Answers

3
4
2
1

Questions for the Children

1. Why do more cars mean more highways? (Highways get crowded; more space is needed to move people faster.)

2. Why do more highways mean that people will buy more cars? (If the highways are large and easy to use, people will prefer private cars.)

3. How can we stop this cycle that is destroying our air quality and using up billions of acres of precious land? (We could invest in new forms of transportation, change our community planning, limit the number of cars produced, or limit population.)

Activity (social studies)

Palo Alto, California, is one of the leading bicycle communities in the country. The children can write to the Chamber of Commerce or the Mayor's office to find out what this community has done.

Activity (social studies)

Ask the children to fold and then cut a piece of 8½" x 11" paper into about 16 squares. On each square, write the name of an important building in their community such as a school, post office, food store, clothing store, farm, factory, church or temple, town hall, etc. Now ask the children to arrange the squares on a large piece of green paper in such a way that few cars would be used; be sure people can get to places safely, easily, and quickly on foot, on bikes, or using other means of non-polluting transportation. The places that people need to go often should be located near them.

ACTIVITY BOOK PAGE 13

Words to Introduce

fuels - things that burn and produce heat and power.

power plants - places where electrical energy is made.

electricity - energy that can make a lamp light when you plug it into a wall socket.

sulfur dioxide - a gas that makes it hard to breathe.

General Information

Explain that without intense heat, burning is incomplete and expels pollutants. In many states, burning cannot be done in communities of over 5,000 people. Violations should be reported to town officials or to the state department of health.

In some countries such as Sweden, children help to oversee citizen responsibility and may report offenses to the proper authority. They are "environmental monitors."

Electric power plants and many factories burn oil or coal containing sulfur. When the fuel is burned, it emits sulfur dioxide, a poison that irritates the eyes, nose, and throat; damages the lungs; kills plants; rusts metals; and also reduces visibility. The strong smell of sulfur is noticeable upon the initial lighting of a kitchen match.

Answer

The students will see the black carbon residue on the plate. They should draw a picture of it.

Activity (science)

An additional method to identify the smell of sulfur dioxide involves obtaining a small amount of sulfur from your high school chemistry department. It should be about the size of a pencil eraser. Burn it so that the children can learn to recognize the distinctive smell. This is a good outdoor experiment because the gas has a powerful odor.

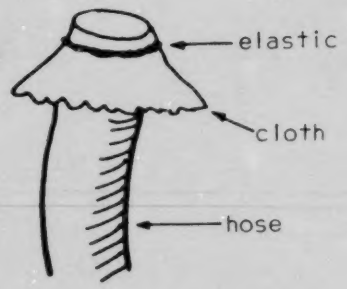
Activity (science)

According to many sources, electric power companies are the major polluters in many parts of the United States. Filtering devices can be placed in the stacks of power plants thus reducing over 90% of the sulfur pollutants blamed for causing acid rain. However, these devices are expensive. The public must be willing to pay for this expense through higher electric rates or higher taxes if the government helps the utilities.

A lint trap in a clothes dryer is a type of filter. It filters out lint, dust, and small objects.

To make a filter, put a piece of white cloth over the end of a vacuum cleaner hose.

Let the vacuum run for about 5 minutes. A brownish disc usually appears on the inside of the cloth. (Of course, this filter is working in the opposite way from smoke stacks, where dirty air is going out.)



ACTIVITY BOOK PAGE 14

Words to Introduce

nuclear power - energy that is given off when very small pieces of some things (atoms) break apart or join together.

radiation (nuclear) - the way in which nuclear energy is given off.

General Information

Radioactivity is a form of air pollution that we do not know enough about. Its effects are cumulative. Although we do live

with some natural radiation, more is not better; the effects build on one another. Because the effects of radiation are not immediate, it is difficult for some people to understand the dangers of future cancers and genetic mutations.

There is concern over low-level radiation exposure to x-rays and to ordinary releases during every stage of the full cycle of operating nuclear plants. An accident at a nuclear power plant can release radiation and could be extremely dangerous, contaminating thousands of square miles of land. In fact, the entire nuclear cycle involves problems. Uranium miners have high cancer rates; the wastes from the mining are extensive and dangerous; some of the high-level wastes from the plants will be dangerous for 7,000 generations, and we do not know how to store them safely. Many people feel that it is immoral to inflict this danger on people who are not yet born.

Answers

Jelly Jam should look angry.

Yes ____ should be checked.

There are many dangerous things that cannot be seen--especially gases. The gas from the tailpipe of a car can kill living things. Germs cannot be seen nor, in general, can electricity.

Questions for the Children

1. Where can natural radiation be found? (Natural radiation comes from the sun, from rocks, and from soil. It is also in some food, in air, and even in our homes.)

2. Why doesn't it hurt people? (There usually is not enough to injure us. However, the effects of radiation are cumulative. They increase as more radiation is added to the body.)

3. How can healthy people keep from getting too much radiation from x-rays? (People should have them only when absolutely necessary. Lead aprons should be worn. If possible, we should be sure equipment has been checked and that the doctor is not ordering x-rays only to protect himself/herself legally.
Of course, x-rays can be helpful for people who already have cancer. They can kill the cancer cells.
Keeping a card that tells what part of the body was x-rayed and when is a very useful habit.)

4. Why is nuclear energy considered the most expensive kind of energy? (So many safety features are needed; the construction is so complicated; the power source is so centralized; when anything goes wrong, the plants must stop run-

ning, and another kind of energy must be used; a lot of money is spent trying to convince people that it is safe; the plants get old after about 40 years and must be taken apart and/or kept away from people for thousands of years; low-level and high-level wastes must be transported over much of the country; then the wastes must be stored somewhere for 7,000 generations, and no one knows how to do that safely.)

Books for Intermediate Grades

Pringle, Laurence, Nuclear Power: From Physics to Politics. N.Y.: Macmillan Publishing Co., 1979. (This book is a clearly written, interesting treatment of a complex subject.)

Books for Adults

Gofman, John, Radiation and Human Health, San Francisco: Sierra Club Books, 1981. (This 908-page volume is an authoritative investigation of radiation and diseases.)

ACTIVITY BOOK PAGE 15

Word to Introduce

sprays - clouds of little drops.

General Information

Residual sprays such as DDT, aldrin, dieldrin, BHC, endrin, heptachlor, and mirex are endangering the existence of or causing the extinction of many species.

A dramatic example of a species becoming extinct is the passenger pigeon. It once was the most numerous of all birds.[4] One flock was estimated to be "300 miles long and a mile wide."[4] Its extinction was caused by the destruction of the forests and by the hunters who netted the creatures. The last passenger pigeon died in 1914 in a zoo.

As a result of DDT spraying, eagles, the symbol of our country, have become very scarce. Ospreys were an endangered species until DDT was made illegal.

2,4-D is now legally sprayed on huge forest lanes and along roads for weed control. It can cause mutation changes in mice at the lowest dose levels. Many scientists feel it causes deformed children.

---

[4]John K. Terres, Encyclopedia of North American Birds, p. 735.

DDT and other sprays get into the food chain because they do not break down. As these poisons fall into the water, they are taken into the bodies of living creatures such as insects, frogs, and fish. These fish are eaten by birds. These birds then produce either infertile eggs or eggs with shells that are so thin that they break before the baby birds are ready to hatch. This process is called biological magnification; that is, it magnifies as it goes through the food chain.

People also absorb DDT and other pesticides when they drink water in certain places and eat certain foods--especially meats, fish, fruits, and vegetables. These pesticides may cause sterility and/or cancer. Many poisonous sprays that are illegal in this country we export for use on food from the Caribbean and Central and South America...which the United States then imports in great quantities.

Answer

The dots should be colored brown in each picture.

Questions for the Children

1. Why is it a good idea to wash fruits and vegetables before eating them? (Washing removes some of the surface chemicals and germs.)

2. If you could buy unsprayed apples with a few brown spots on them or big, perfect sprayed apples, which would be better for you to eat? (It would be better to eat the unsprayed apples.)

3. Spraying insects with insecticides has not completely stopped the bugs from eating plants. Why not? (The insects have often become immune (not hurt by) the chemicals.)

Books for Intermediate Levels

George, Jean, Who Really Killed Cock Robin? N.Y.: E.P. Dutton, 1971. (This book is an ecological mystery story for grades 4-7)

Many bug sprays also pollute the air. When it rains, these sprays mix with the rain water. The poisons run into the land and the water.

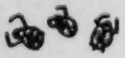
These sprays can kill birds and other animals. They can make people sick, too.

Look at the pictures below. Find the little dots in each picture. The dots are the poisons in the sprays. Color the dots brown in each picture.

1. Rain water falls over sprayed soil.

2. The water runs into a river. Now there is spray in the river.

3. The spray gets into bugs in the river.



4. Fish eat the bugs. Now the spray is in the fish.

5. Some birds eat those fish. Now the spray is in the birds.

6. Birds lay eggs. Some of the spray is in the eggs. It makes the egg shells too thin.

7. Sometimes the thin egg shells break before the babies are ready to come out. Then the little birds die.

15

Books for Adults

Carson, Rachel, Silent Spring, New York: Houghton-Mifflin, 1962. (This classic alarm call that awakened millions to the dangers of insecticides remains compelling reading.)

Commoner, Barry, The Closing Circle, New York: Knopf, 1971. (This fascinating book describes the dangerous relationships between man, technology, and nature.)

Dadd, Debra Lynn, A Consumer Guide for the Chemically Sensitive, San Francisco: Nontoxic Lifestyles, Inc., 1982. (This well-researched paperback makes one aware of the chemicals involved in ordinary living and gives alternatives to them. 450 Sutter Street, Suite 1138.)

ACTIVITY BOOK PAGE 16

General Information

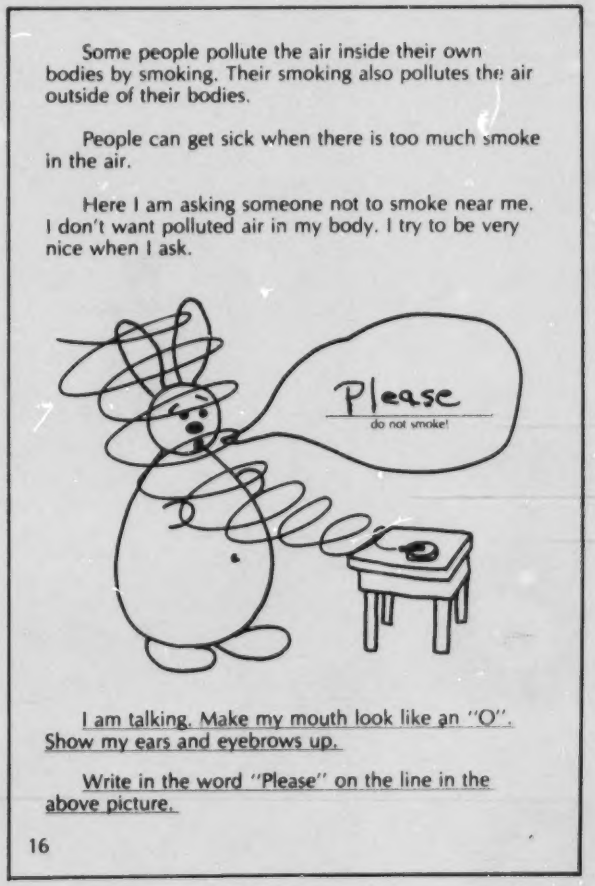
Smoking can cause cancer and heart disease. Regular smoking can also make people less attractive. It causes bad breath, stained fingers and teeth, and unhealthy skin color.

Smoking is a form of air pollution. Smoke from a lighted cigarette is more dangerous than that which comes out of the smoker himself/herself. Atmospheric scientists at the State University of New York have found that only one-third of the small particles entering the lungs are exhaled. Lungs are good air filters; they keep the particles in the smoker.

Children who live in the home of a smoker may have more colds and respiratory infections than normal.

Answer

Jelly Jam's face should be changed, and the word "Please" should be written on the line.


Some people pollute the air inside their own bodies by smoking. Their smoking also pollutes the air outside of their bodies.
People can get sick when there is too much smoke in the air.
Here I am asking someone not to smoke near me. I don't want polluted air in my body. I try to be very nice when I ask.
Please
do not smoke!
I am talking. Make my mouth look like an "O". Show my ears and eyebrows up.
Write in the word "Please" on the line in the above picture.
16

Experiment: Lungs as Air Filters

Does any part of the cigarette remain in the smoker? Are lungs good filters?

This experiment should be performed by an adult smoker at the discretion of the teacher or parent. It illustrates the residue that is left in the body of the inhaling smoker.

Materials
cigarette
2 pieces of tissue

Directions

1. Obtain a cigarette and two pieces of white tissue.
2. Cover the mouth end of the cigarette with one of the tissues.
3. Inhale.
4. Exhale the smoke into the second tissue.

The difference in the two spots on the different tissues is the material that remains in the body.

Questions for the Children

1. What is on the tissue? (Tobacco and chemicals.)

2. Where did the materials come from? (They came from inside the cigarette and are released during the burning.)

3. Did everything that went into the smoker's body come out? (No.)

4. What do you think happens to the material left in the smoker's lungs after a long period of time? (The cleaning hair cells can't work as well; the mucus cannot be cleaned out; infection can begin; cancer cells can begin to grow.)

5. Would it be better for you to breathe the smoke that comes out of the smoker or the smoke from a burning cigarette that is sitting on an ashtray? (The smoke that has been inside the smoker is less harmful to another person; some of the poisons have been left in the smoker's lungs. Of course, it would be best to leave the smoking area.)

ACTIVITY BOOK PAGE 17

Words to Introduce

environmental protection - keeping your surroundings safe.

moderate - fair, all right.

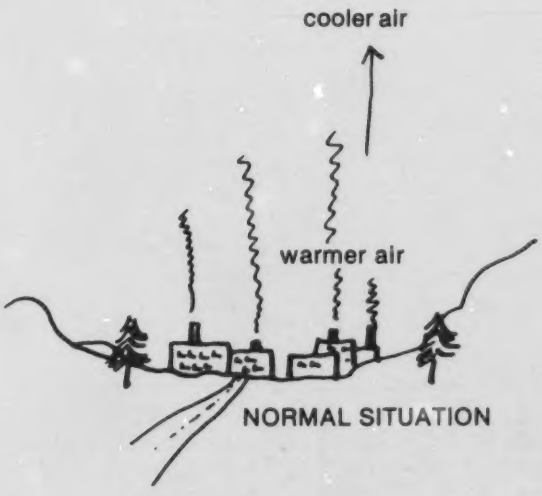
unhealthful - not good for you.

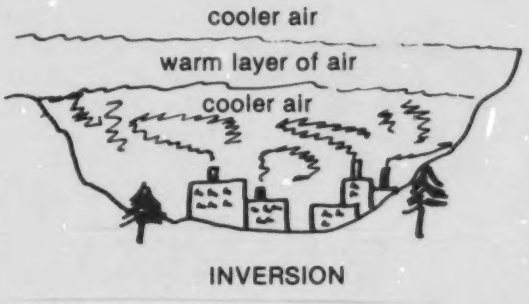
hazardous - very bad for you.

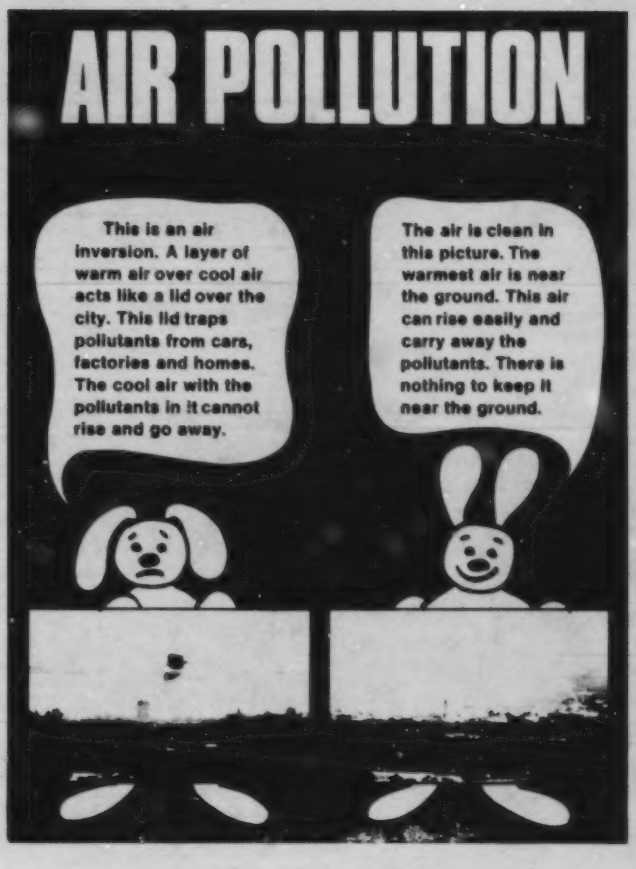
General Information

Air pollution is more prevalent on some days than others, and it is the result of weather conditions acting upon the gases and particulates that are released into the atmosphere--often during burning. MOST AIR POLLUTION IS INVISIBLE. The moisture level is directly related to visibility. The color of the air when viewed from a distance can be a good indicator of certain kinds of pollution levels.

One weather phenomenon is the air inversion--when a lid of warm air holds down the cold air and the pollutants. The trapped pollutants cannot disperse upward.






AIR POLLUTION
This is an air inversion. A layer of warm air over cool air acts like a lid over the city. This lid traps pollutants from cars, factories and homes. The cool air with the pollutants in it cannot rise and go away.
The air is clean in this picture. The warmest air is near the ground. This air can rise easily and carry away the pollutants. There is nothing to keep it near the ground.

Answer

If the children cannot locate the pollution index from the newspaper, try calling your local health department, nearby weather station, or lung association. Using one's senses of sight, smell, and taste can be of some help in identifying certain types of air pollution such as sulfur dioxide, nitrogen dioxide, or hydrogen sulfide. Breathing difficulty may also indicate poor air quality.

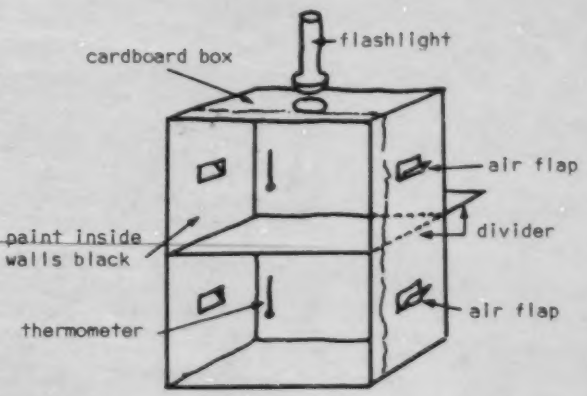
Put up Poster 3 if you have purchased one. It is a photograph of a city under an air inversion and the same city on a clear day.

Activity (science)

The children may be interested in an inversion box which clearly illustrates an air inversion.[5] By inserting a pollutant, cigarette smoke, into the darkened interior of the box, a situation is created that is much like the atmosphere in many of our larger towns and cities.

Warm air can enter the box through a hair dryer. Air can be cooled by inserting an ice tray or dry ice. Hot air rises, so the smoke in the box disperses when the lower air is warmer than the upper air. This is like a typical daytime situation. The smoke is trapped, however, when the lower air is cooler. This situation is one that occurs in the early morning before the solar heat affects the earth's surfaces.

THE INVERSION BOX



Put clear plastic cover over front.

[5] John McGavack, Jr., and Donald P. LaSalle, Crystals, Insects, and Unknown Objects, New York: The John Day Co., 1969. (Reprinted by permission of the publisher.)

Activity (math)

Record the daily varying pollution levels by constructing bar or line graphs.

Activity (social studies)

Try to obtain an air quality map from your state health department. Have the children locate areas that they know on the map. Talk about air pollution sources and where the air quality boundaries will be in five or ten years if the pollution continues to increase. Note that the direction of the prevailing winds in your area may affect the air quality boundaries. Call the local weather bureau or station to learn what the boundaries are.

ACTIVITY BOOK PAGE 18

Questions for the Children

1. Do you cause air pollution sometimes? (Yes.)

2. In what ways do you cause air pollution? (The child probably rides in a car or other vehicle, may ride mini-bikes, most likely uses electricity, may use sprays, and may use energy-demanding tools or toys. Polluting processes may have been used in the manufacture of these products. Their disposal may also cause pollution.)

3. What can you do to help clean up the air? (Most children will think about what their parents can do, but it is important to emphasize that students have responsibilities to make correct decisions on how much electricity they use, how many non-renewable resources they consume, etc. They also have the power to influence their families and other people.)

JELLY JAM'S PREVENTION

Pages 19 through 29 are concerned with what children can do to help to solve the problems of air pollution. These pages can be done by an individual child or by groups of children working together. Children may need help constructing the bird mobile and completing page 21.

ACTIVITY BOOK PAGE 19

Word to Introduce

exercise - to move around a lot.

General Information

Most people spend too much time sitting in cars, at jobs, in school, watching television, and doing other sedentary activities. This lack of exercise is injurious to one's health and is a contributing factor to heart disease and back trouble. Brisk walking, bike riding, and swimming are excellent forms of exercise and lead to better muscle tone and blood circulation.

To illustrate this point to the children, have them run in place for two minutes. Then have them observe the effects of this activity. They will notice increased color, more rapid breathing, and an increased pulse rate. Increased blood circulation makes the heart pump faster; more oxygen is demanded, and deeper breathing results.

Discuss the physical attributes of exercise; i.e., as an aid to a better complexion, hair health, muscle tone, and weight control.

Answer

Jelly Jam's cheeks should be pink. (Jelly Jam might even be wearing good, sturdy walking shoes.)

Activity (health)

Ask a doctor, town health officer, or school nurse to come in to discuss the benefits of exercise.

ACTIVITY BOOK PAGE 20

Answers

1. c
2. d
3. a
4. b

ACTIVITY BOOK PAGE 21

Word to Introduce

vacuum cleaner - a small machine used for cleaning.

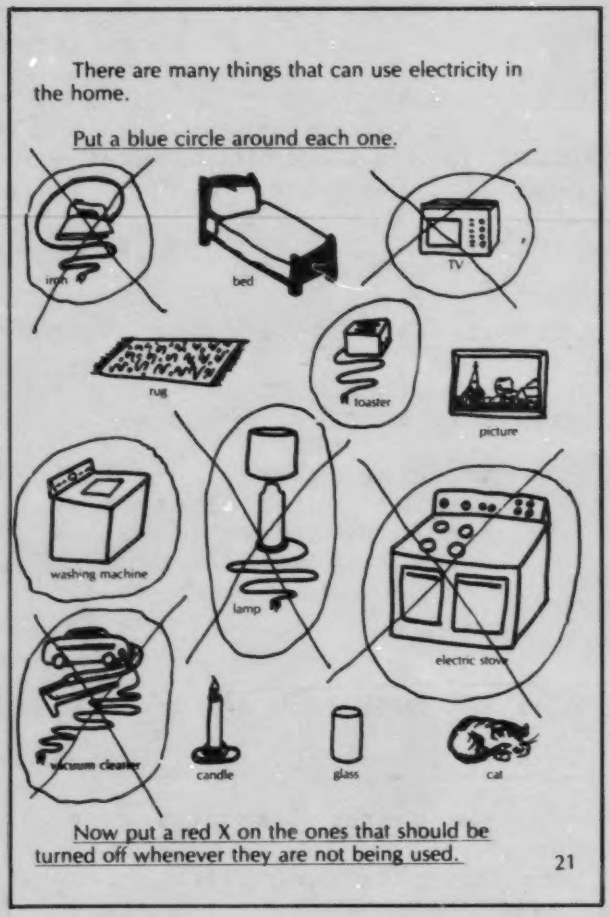
Answers

Blue circles should be around the following items:

iron	TV
toaster	washing machine
lamp	electric stove
vacuum cleaner	

Red X's should be on these items:

iron	TV
lamp	electric stove
vacuum cleaner	



Questions for the Children

1. Why were people probably stronger in colonial times? (They had to do more physical work.)

2. What would happen to people if everything were done for them and they did not use their muscles? (Their muscles would weaken and atrophy; people would become more dependent on machines and on a few stronger people.)

3. Is there anything in your classroom or home that is electric that could be run less expensively and more healthfully by muscle power? If it were run by "people power," what good results might occur? What problems might such a change cause?

Activity (social studies)

Ask the children to list in their scrapbooks 20 items that use electricity.

Then ask them to circle the items that are more essential to living (stove, refrigerator, lamps) than some other items.

Finally, have them put an X next to the items that are non-essential but which may make daily life slightly easier in some small ways (electric blanket, electric can opener, etc.). If possible, have the children explain why ordinary blankets or a hand can opener might be better in some ways (less mechanical problems will arise; less money will be spent on purchasing and operating the items).

Activity (social studies)

Have the children play games of "energy equivalents." Which uses more energy? Why?

Watching color TV or playing a board game?
Washing your clothes or wearing them for one more time?
Preparing and eating a 1/4 pound hamburger or a 1/4 pound piece of cheese?

ACTIVITY BOOK PAGE 22

Word to Introduce

thermostat - something on the wall that helps to make a room or building warmer or cooler.

Answe

There should be a red X on the thermostat, and Jelly Jam's sweater should be dark. (He is in a sunny place. Ask the children to draw a sunny window behind Jelly Jam.)

The black paper will be warmer. Dark things take in or absorb heat (sunlight). Light things throw back or reflect heat (sunlight).

Black? _____

Here is another way to help stop pollution. Don't turn up the **thermostat**!

Put a red X on the thermostat.

When I am cold, I do not turn up the heat right away.

Instead, I put on my sweater.

I am wearing a dark sweater. Color it.

Find out why I am wearing a dark sweater by doing the following experiment.

EXPERIMENT

1. Wet a piece of black paper and a piece of white paper.
2. Put them on a plate near a sunny window.
3. Feel the papers after twenty minutes.

Which paper is warmer? Black?✓ White?___

(Look on page 66 to find out why one color is warmer than the other!)

22

Questions for the Children

1. If someone lives in a warm place, should the roof of his house be light or dark? (The light-colored roof would be cooler as the heat from the sun would not be absorbed into the home as easily.)

2. Why do people who move around a lot often not get as cold as people who sit still? (Exercise raises body temperature.)

ACTIVITY BOOK PAGE 23

Words to Introduce

solar - having to do with the sun.

tongue - something inside the mouth that can move. It helps people to speak and to eat.

General Information

We are just beginning to re-learn heating and cooling concepts that most so-called more primitive cultures--cliff dwellers, Romans, Greeks--practiced long ago. We are discovering that the earth's mean temperature can warm and/or cool us. By using proper home siting, design, and insulation and by employing the wind and sun and other renewable energy sources, most of the United States could supply the majority of its energy needs.

Answer

The colored picture should include a panting dog.

Questions for the Children

1. Why do sea gulls stand with their faces to the sun on hot days? (They face directly into the sun so that the smallest percentage of their body is hit by the sun; their chests are white and reflect light.)

2. Why do sea gulls stand with their backs to the sun on cold days? (More area gets the light, and the dark wing feathers absorb the sun's heat.)

3. If the sun shines in your window in the middle of the day during the winter, what direction does your window face? (South)

4. If you have south-facing windows and the sun is out, why is it not a good idea to pull the shades or close the

curtains during the day in the winter? (The sun's heat will warm your home.)

Activity (science)

See if the children can find animal homes that use the sunlight for heat and the earth for cooling or warming. Woodchucks often build good homes for summer and winter weather. The animal is cooled by the earth in the summer and warmed in the winter.

Activity (social studies, science)

If possible, take a field trip to a solar house. Visit both passive solar homes and homes or buildings that use active systems for water and for space heating. (Passive solar homes use design, siting, and insulation to create warmth on sunny days. Active solar systems use special devices that usually heat water.)

Experiment: Building a Passive Solar House

Is it possible to heat a building with the sun and to store the heat in the house?

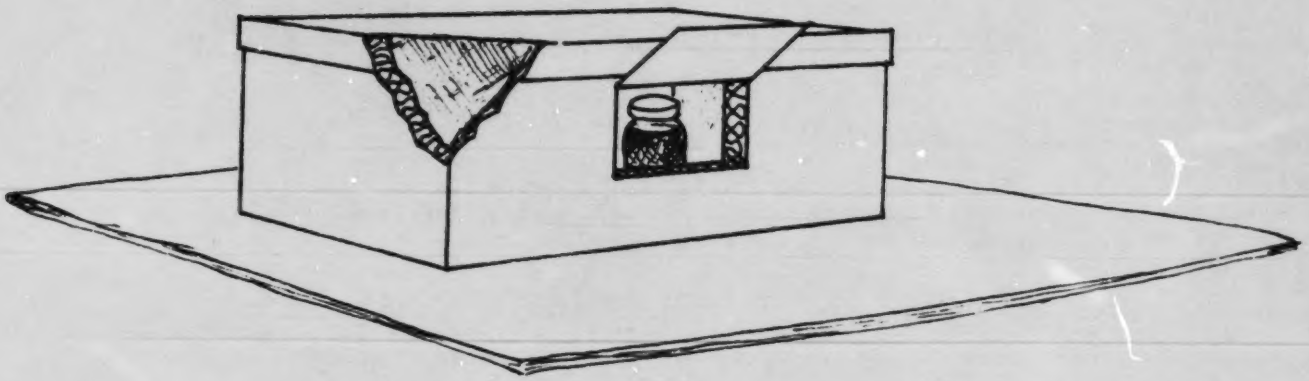
Materials

2 shoe boxes, 1 slightly larger, 1 slightly smaller
shredded newspaper or pink fiberglass insulation
soft clay
plastic tape
used plastic bag
small glass bottle filled with dark colored water (paint, food dye)
glue
scissors
thermometer

Directions

1. Remove the shoe box lids.
2. Place the smaller box inside the larger one.
3. Insulate the space between the boxes.
4. Tape the space between the two boxes to keep the insulation from falling out.
5. Cut out one very large window on one long side of the house. Do not cut off the top of the piece; use it as a flap.
6. Cover the window with plastic and tape it to the inside walls.
7. Put the larger lid on the bottom of the house and glue it firmly to a pile of newspaper about one inch thick. The newspaper will act as insulation.
8. Make a roof if you wish. Insulate it well.
9. Fill a small glass bottle with colored water. The water's temperature should be the same as the air temperature. Add warm or cold water to make it the same.

10. Put the bottle inside the house. Then place the house near a warm, sunny window.
11. After an hour, remove the bottle. Take the temperature of the water.
12. Now close the window flap tightly and leave the bottle in the house for one hour. Measure the water temperature again. Is it warmer than it was at the beginning of the experiment?



Questions for the Children

1. Has the water heated up in the house? (Yes.)

2. At night, how can we keep warm air in the house? (Close the windows. Cover them with a tight insulated covering, if possible. The more insulation on the window, the less heat we lose through the window.)

3. In warm weather, how could we keep the house cool? (Be sure that there is an overhang on the roof over the window to keep the sun from coming in; be sure that the roof is light-colored so the heat is reflected; push earth around the back and sides of the house for additional insulation. Students could experiment by putting the house in a sandpile and leaving only the front and roof exposed. Various water temperatures could be taken before and after a day of sand covering.)

Activity (science)

If you are unable to construct a passive solar house, a small working model can be ordered from Crystal Productions, Box 12317, Aspen, CO 81612.

Activity (social studies)

Plan a small solar village. Use wooden blocks for houses or use toy buildings. Blocks of wood can be obtained from a generous foreman of a construction project, from a nice lumber yard owner, or from a friendly carpenter. Use a lamp as the sun. Be sure that all buildings face south and that they do not shade each other thereby blocking out the sunlight.

An ideal scene is pictured on the "suburban utopia" poster from RAIN. (See page 98)

Activity (social studies)

Write letters to the following communities which are using, researching, and experimenting with solar buildings and a more benign, renewable energy way of life.

1. The New Alchemy Institute, East Falmouth, MA 02536.
(This community successfully practices organic gardening, fish raising, tree farming, and obtaining energy from the sun and wind.)

2. "Mother Earth," Hendersonville, NC 28739.
(This community is working on similar projects and publishes a delightful magazine called Mother Earth News.

Activity (language, science)

Wind can also be a safe, renewable, and powerful source of energy. Windmills can generate electricity. Jacques Cousteau's new Calypso II is a ship powered by the wind. Write to the Cousteau Society to find out how it works. (8430 Santa Monica Boulevard, Los Angeles, CA 90069)

Activity (art)

Another way to save oil, which is not a renewable source of energy, is to wear cotton and/or wool clothing. These materials come from plants and animals. Synthetic fibers (polyesters) are made from oil.

Ask the children to draw Jelly Jam wearing blue jeans. He loves them! They are made of cotton, a natural fiber, last a long time, do not need to be dry-cleaned, and do not show the dirt easily.

Books for Primary Grades

Berger, Melvin, Energy from the Sun, New York: T.Y. Crowell Co., 1976. (This colorful, factual book explains energy and how most of it comes from the sun.)

Books for Intermediate Grades

Hoke, John, Solar Energy, N.Y.: Franklin Watts, Inc., 1978. (This advanced, detailed book describes exactly how various types of solar energy work.)

Smith, Norman, Wind Power, New York: Coward, McCann and Geohegan, Inc., 1981. (Interesting illustrations make a very useful book.)

Spooner, Maggie, Sunpower Experiments: Solar Energy Explained, New York: Sterling Publishing Co., Inc., 1980. (This attractive book describes five solar projects--sundial, solar water heater, model home, solar still, and a solar oven.)

Books for Adults

Butti, Ken and John Perlin, A Golden Thread - 2500 Years of Solar Architecture and Technology, New York: Van Nostrand Reinhold Co., 1980. (The history of solar energy is described in this fascinating book.)

Note: For an extensive list of adult and children's materials on renewable energy, send for the EARS catalogue. (Environmental Action Resource Service, Box 8, Farisita, CO 81037)

ACTIVITY BOOK PAGE 24

Words to Introduce

marigold - a small, brightly colored plant that has a strong smell.

swatter - something to hit flies with.

General Information

NO PESTICIDE HAS EVER BEEN SHOWN TO BE HARMLESS TO MAN. Pesticides should never be used by children. Malathion, used during the California fruit fly problem in 1982, can be dangerous to unborn children, may kill nerves, and may affect learning ability. It is also poisonous to fish and even peels paint from automobiles.[6]

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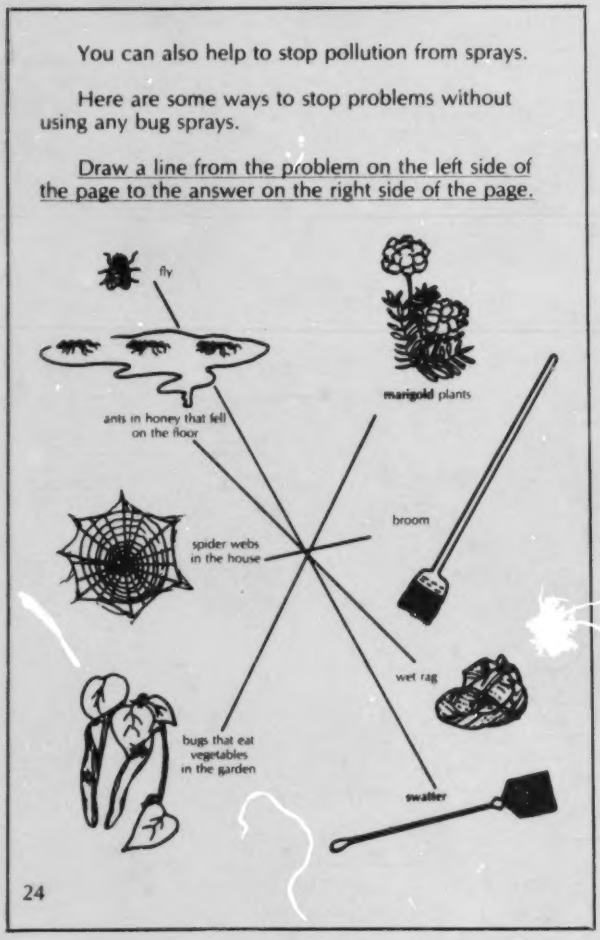
[6]Not Man Apart, Friends of Earth, March, 1981.

There are many safer methods for keeping insects out of houses and gardens. Planting crops in different areas each year, mulching soil, and planting plants that repel insects are a few of these choices. Garlic, marigold, tansy, onion, nasturtium, and mint are repulsive to many creatures.

Weeds can be removed by digging or discouraged by being buried under mulch.

Answer

See picture.


You can also help to stop pollution from sprays.
Here are some ways to stop problems without using any bug sprays.
Draw a line from the problem on the left side of the page to the answer on the right side of the page.
fly
ants in honey that fell on the floor
marigold plants
spider webs in the house
broom
wet rag
bugs that eat vegetables in the garden
swatter
24

Activity (science)

Encourage children to plant a small garden at school or at home--even in a window box. Radishes grow quickly; tomato plants bear heavily. Urge the children to plant French marigolds and dill around the tomatoes. Using plenty of mulch (hay, grass clippings and/or leaves) will help the soil retain water and discourage weeds.

Activity (science, social studies)

Visit an organic garden or farm. Food raised in an organic garden is the safest and healthiest produce one can eat. A 1980 United States Government study stated that over 26,000 farmers in 23 states were using organic methods in farms of all sizes.

Books for Adults

Organic Plant Protection, Roger Jepsen, ed., Emmaus, PA: Rodale Press, Inc., 1976. (This book is an extremely clear and comprehensive reference on controlling insects and diseases without using chemicals.)

ACTIVITY BOOK PAGE 25

General Information

Birds eat an amazing number and variety of insects. As an example, the phoebe eats cottonboll weevils, strawberry weevils, corn-leaf beetles, cucumber beetles, ants, grasshoppers, locusts, moths, caterpillars, ticks, and spiders.

Scientists have found that insects and other creatures also eat insects and that this relationship can be put to use. In California, one breed of mosquito has been reduced by bringing in the common guppy fish; it eats the mosquito larvae.

Answer

Birds should be drawn around Jelly Jam.

Question for the Children

In what ways would a wild yard be better than a lawn? (Lawns cost money to maintain. Many people use chemicals on their grass to keep native plants away. These chemicals could hurt the users, the owners, the wildlife, and get into the water supply. Not mowing also saves gasoline and oil. It is cheaper, healthier, safer, less work, and more interesting to encourage wild plants.)

Activity (science)

Raising useful insects can be interesting. The praying mantis is especially large and unusual. Egg cases can be ordered from Ringer Research, 6860 Flying Cloud Drive, Eden Prairie, MN 55344.

Activity (science)

Interesting wild plant seeds may be ordered from:

Park Seed Company
254 Cokesbury Road
Greenwood, SC 29647 (Eastern plants)

Natural Habitat Nursery
4818 Terminal Road
McFarland, WI 53558 (Western plants)

It is very important that children know that rare wild plants should not be dug up or transplanted. Nature centers, natural history museums, botanical science departments, or state park and forest offices may be able to help identify any unknown specimens.

Activity (science)

Plan a wild place in the school or home yard. Transplant common wild plants and let the grass and weeds grow. Record and observe the wildlife before and after the project. An information kit on transforming backyards into small wildlife refuges may be obtained by sending $1 to:

Backyard Wildlife Habitat Program
National Wildlife Federation
1412 16th Street, N.W.
Washington, DC 20036

Activity (science)

Ask a representative from the fish and game division of your state to speak to the class about what it can do to aid the specific natural school environment.

Activity (science)

Make a brush pile so that small birds and animals can find shelter. Record the various species that use the pile.

Activity (science)

Plant small trees or bushes around your school or home area that will provide habitat improvement or windbreaks for wildlife.

Activity (science)

Discuss with your class the preservation of wetlands and park areas. They are necessary to insure an adequate wildlife population. These lands also provide water storage and aid in flood control by slowing run-off.

Activity (social studies)

Try to find out if your state has bounties on uncommon animals and birds. Organize your class so that they can write letters to their state legislators about the removal of these bounties.

Activity (science)

Find out if there are any endangered species of birds or animals in your area. At least eight animals that are official symbols of their countries are in danger of extinction according to the Amicus Journal. As many as one million species (from a planetary stock of perhaps five to ten million) could be extinct by the year 2000. That is a species lost every ten minutes between 1983 and then.

Questions for the Children

1. What can be done to save any endangered animal or plant species in your area? (Land can be preserved; habitats can be improved; people can be educated.)

2. Why should we be concerned about the disappearance of a certain bird, animal, or plant? (We often do not understand the complex interrelationships of various species and their interdependence on each other. For example, when hippopotamuses were removed from a river in Africa, a bad sickness killed many people. No one had understoood that these animals in the river stirred up the bottom, keeping certain snails from multiplying. With the hippopotamuses gone, the snails spread and carried deadly germs with them.

Also, certain plants and animals can act as medicines and foods that can be very helpful. Many medicines are still made from plants. Aspirin can be made from willow. Celandine has recently been found to work against a certain type of cancer. Finally, many people feel it is morally wrong to change permanently the environment in such a drastic way.)

3. Long ago, miners carried canaries in cages down into underground mines. If the birds sickened and died, the miners knew invisible poisonous gases were spreading through the tunnels. The birds acted as "early warning systems." Today wild birds still act as early warning systems. Can you guess what happened to the pheasants and quail that ate plants along the roadsides in Wisconsin? (They were poisoned by the salt that is put on the roads during the winter. Sometimes this salt gets into people's drinking water.)

Books for Intermediate Grades

Pringle, Laurence, Wild Foods, New York: Four Winds Press, 1978. (This clear, readable, attractive book focuses on 19 very common edible plants.)

Books for Adults

Duffey, Eric, Conservation of Nature, New York: Doubleday, 1975. (The photographs of world conservation challenges are both interesting and useful.)

Materials for Children and Adults

Records:

Common Ground and Callings. Paul Winter Consort. Living Music Records, Box 72, Litchfield, CT 06759.

The Language and Music of the Wolves. Columbia Records.

ACTIVITY BOOK PAGE 26

Words to Introduce

trace - to draw by putting a thin piece of paper over something and following the lines with a pencil. Your drawing should look like the one underneath it.

cardinal - a bright red bird that eats lots of bugs and seeds.

General Information

The outline shown in the activity book is that of a cardinal--a red bird. It is mainly a seed eater, but it also consumes a great number of insect pests including cucumber beetles, corn earworms, and boll weevils. The cardinal also eats the seeds of many weeds.

Answer

Cardinal should be circled.

Questions for the Children

1. Why is it good to have a great variety of birds? (Each type of bird eats different kinds of insects and/or seeds and thus controls these particular populations.)

2. In what ways would our lives be changed if there were no more wild birds? (We would be overrun with insects, mice, moles, and weeds. Our beaches, roads, and forests would be filled with decaying animal life. We would also, of course, miss the sounds and colors that birds bring to our lives.)

Activity (science and art)

Making a mobile of all the birds that visit the schoolyard or live in the community is an excellent science research project.

The children may change the outline of the bird by simply rounding off the head and elongating the beak to resemble any bird familiar to them.

AIR POLLUTION REVIEW

ACTIVITY BOOK PAGE 27

General Information

In order to review the ideas about air pollution, try to have the children draw something that contributes to air pollution which has not been discussed. Trucks, snowmobiles, fireplaces, mowers, snow blowers, and even burning leaves all expel pollutants to some degree.

Air pollution may also take various forms. Odors from a chemical plant can be annoying and may be dangerous to breathe.

Certain kinds of electromagnetic radiation cause another invisible air pollution problem. Microwave ovens may leak radiation if they are not working properly. The actual long-term effect of cooking food by agitating molecules through rapid reversal of their natural electromagnetic orientation is unknown.

If possible, it is wise to avoid living or working around high-power radiowave or microwave equipment (FM radio station towers, radar units for airports or defense systems, and private microwave communication systems).

Noise pollution is a growing problem that can cause hearing loss, raise blood pressure, lower efficiency, and trigger ailments such as stomach ulcers and allergies. It can be a slow agent of death. 160 decibels (a measure of sound volume)--only a few more than the sound of many planes at take-off--is lethal to mice and similar small animals.

Answers

The children might draw a picture of the following ideas:

1. The family walking to a destination to which they usually drive, such as the post office, restaurant, supermarket, or to a friend's home.

2. The family taking the car to the garage for a tune-up. A well-tuned car is one which expels fewer pollutants.

3. Organizing a carpool for after-school activities.

4. Making a family mileage chart. The family might record the number of miles driven in one week. Then, by using carpools, walking, or bicycling, they could decrease the use of the family car. Record the decreased mileage of the second week and see how much money has been saved!

5. Cleaning up the roadside and having hot chocolate or lemonade afterwards.

6. Constructing a bird feeder together.

7. Making an x-ray record sheet for each member of the family, telling when and what x-rays have been taken.

8. Writing a letter urging the President to stop financial support of the nuclear energy and to give more support to solar energy and other safer forms of energy production.

Questions for the Children

1. Should a chemical plant control the odors that leave the plant? (The odors are unpleasant and often indicate the presence of chemicals which may affect health. However, the odor alone does tell us that chemicals are present; they may signal us to investigate further the potential danger.)

2. Why should there be special places in public areas for people who smoke? (Smoking can be unpleasant and is hazardous even to those not actually doing the smoking.)

3. Why should a jet airport not be built near a wildlife refuge? (Some of the creatures will not be able to reproduce; others may die.)

4. What happens when lots of small creatures such as mice and moles die? (Large animals lose a food supply. The grasses, weeds, and insects that the small animals ate will increase. The moles no longer tunnel and aerate the soil.)

5. What harm can too much radiation do? (Radiation may cause cells to change and to grow; cancer may develop.)

Books for Primary Grades

Perera, Thomas and Gretchen, Louder and Louder: The Dangers of Noise Pollution, New York: Franklin Watts, Inc., 1973.

ACTIVITY BOOK PAGES 28 AND 29

Word to Introduce

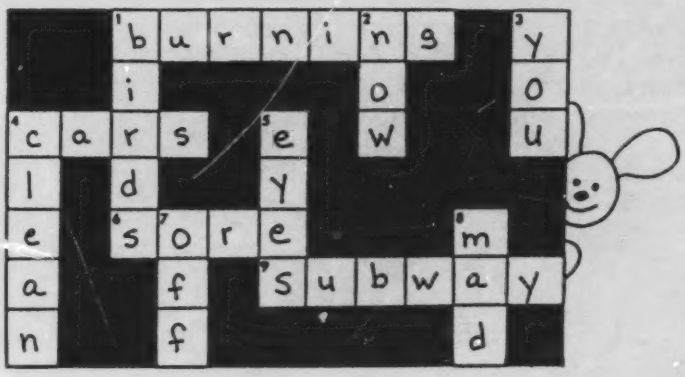
chimney - smoke from a fire goes up through this opening.

Answers

AIR POLLUTION PUZZLE

Do the puzzle using some of the words below. Use the ideas on page 29 to help you.

now	clean	off
sore	pollution	birds
subway	spray	eyes
burning	cars	afraid
lung	you	people
fish	mad	bikes



28

ACROSS

1. Dirty air comes out of a chimney when oil or coal is burning.
4. We would have cleaner air if people did not drive so many cars.
6. Polluted air can make your throat feel sore.
9. An underground train is called a subway. It helps the pollution problem because it carries so many people who might otherwise use cars.

DOWN

1. Millions of bugs are eaten every day by birds.
2. We must work for clean air now before it is too late.
3. You can help to clean up the air.
4. You should talk to everyone about clean air.
5. Air pollution can make your eyes sting.
7. When you are not using lights, turn them off.
8. When they think about living in a dirty, crowded world, many people feel mad.

29

PART THREE: WATER POLLUTION

General Information

Activity Book pages 30 through 42 deal with water pollution. After a background discussion of the water cycle, reviewing Poster 2, underground rivers, the water table, and the introduction of new vocabulary, most children should be able to do these pages by themselves. Some children may need help with pages 34 and 35 and the experiment on page 39. Various groups might enjoy putting on different versions of the play on page 41.

Books for Primary Grades

Gans, Roma, Water for Dinosaurs and You, New York: T.Y. Crowell and Co., 1972. (Clearly explaining the water cycle, this fascinating book shows the relationship of the water that the dinosaurs used to the water we use.)

Books for All Children

Kalina, Sigmund, Three Drops of Water, New York: Lathrop, Lee and Shepard Co., 1974. (This is an excellent book for grades 3-5 that describes the journey of water from mountain to ocean to sky to mountain.)

ACTIVITY BOOK PAGE 30

Words to introduce

ocean beaches - sandy or rocky places along the edge of the sea.

staple - to put things together with a small piece of metal.

General Information

Most children love to swim. Because swimming is such a meaningful experience to so many children, it is given emphasis here.

Any swimming area must be relatively clean and can be kept that way if waste does not enter the water. The waste can be bacteriological or chemical. Children can help maintain clean swimming water by not throwing anything in the water and by not emptying their body wastes into the water.

Answers

Many children may think that the water sources near them are clean until they think about drinking the water. The state department of health in your area should know the classification of the waters near your community:

Class A: Any use, including drinking.

Class B: Fit for drinking after chemical treatment and fit for swimming and irrigating vegetables that are eaten raw.

Class C: Fit for boating and irrigation of crops that are always cooked.

Class D: Suitable for transportation, sewage, and industrial wastes without nuisance.

Class E: Open sewer.

After obtaining the proper classification information, the children can answer the two questions "Yes" or "No."

Questions for the Children

1. For how many different purposes do you use water?

2. How many times a day do you use water?

3. Where does your drinking water come from? (People in urban areas often get their water from surface sources such as reservoirs, lakes, or rivers. Rural homes usually use ground water drawn to the surface by wells.)

ACTIVITY BOOK PAGE 31

Word to Introduce

chemicals - something made or used in chemistry.

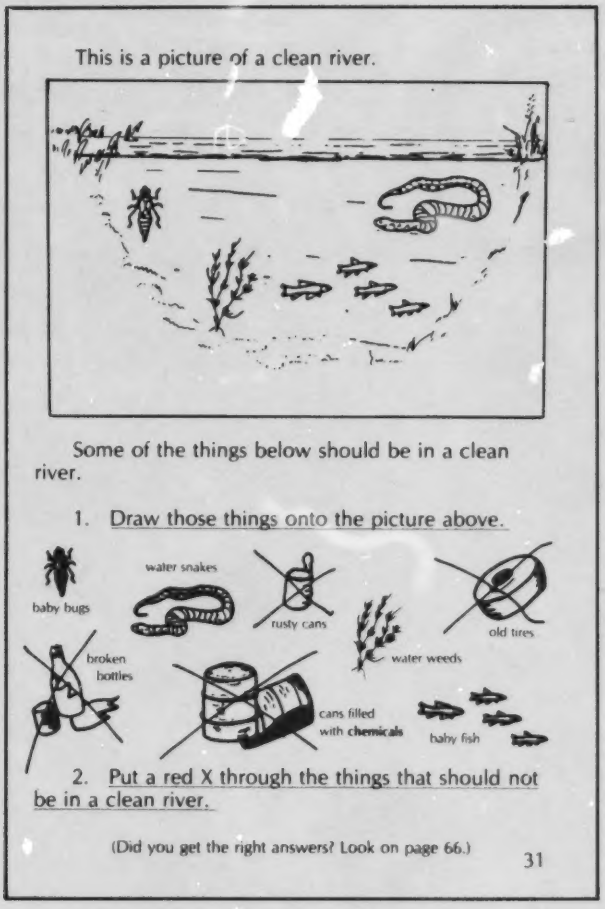
General Information

A clean river should be teeming with a wide variety of life. The presence of insect larvae, bass, trout, and small minnows reveals a healthy water environment. Unfortunately, many children are afraid of these creatures. They are often also afraid of the dark, muddy bottoms of lakes, ponds, and/or rivers. These children are sometimes more comfortable in a swimming pool that looks clean because of chemicals. Although small doses of these chemicals will probably not hurt people, a clean body of natural water that supports fragile life systems is a healthier environment for the fragile human being.

Answers

1. The picture should show baby bugs, water snakes, water weeds, and baby fish.

2. A red X should be drawn through the can, tire, bottles, and cans filled with chemicals.


This is a picture of a clean river.

Some of the things below should be in a clean river.

1. Draw those things onto the picture above.

baby bugs
water snakes
rusty cans
old tires
broken bottles
water weeds
cans filled with chemicals
baby fish

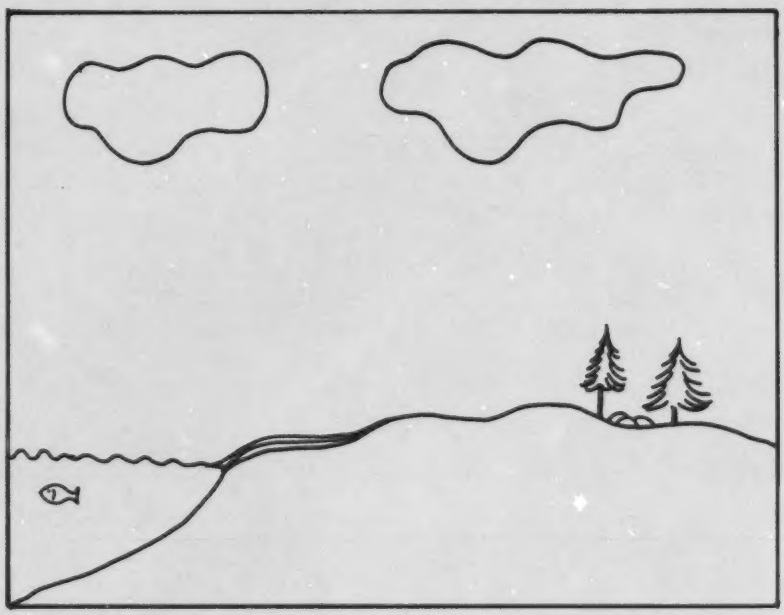
2. Put a red X through the things that should not be in a clean river.

(Did you get the right answers? Look on page 66.)

31

Activity (science)

Draw this picture on the board or on a large piece of paper.

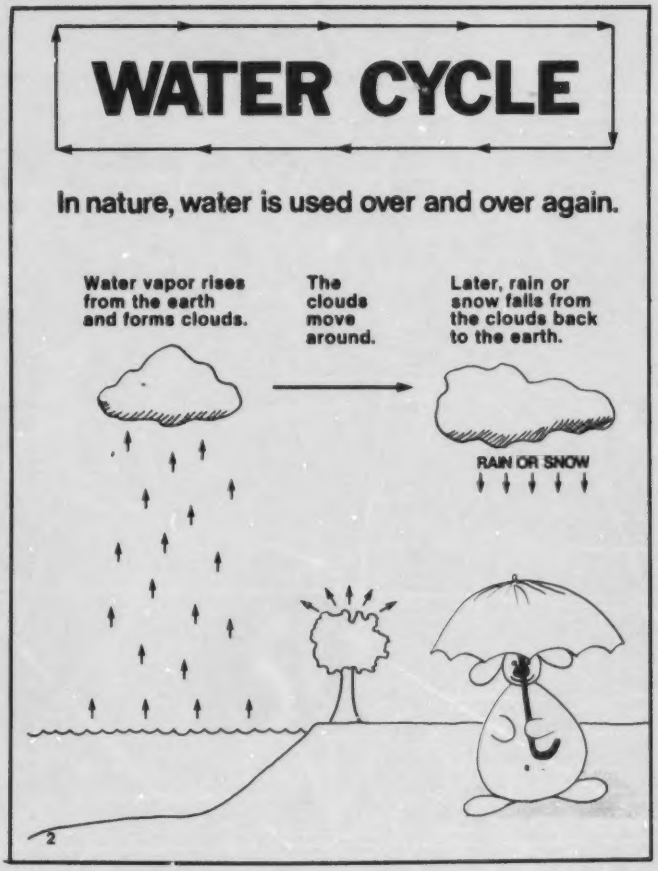


1. Review the water cycle by asking the children to draw arrows showing the water evaporating from the ocean and going into the clouds.

2. Then have them draw arrows showing rain falling from the clouds to the earth.

3. Finally, ask them to complete the cycle by showing rain water soaking into the ground, and flowing into a river, and/or into the ocean.

Display Poster 2. It shows the water cycle and how it works.


WATER CYCLE
In nature, water is used over and over again.
Water vapor rises from the earth and forms clouds.
The clouds move around.
Later, rain or snow falls from the clouds back to the earth.
RAIN OR SNOW
2

ACTIVITY BOOK PAGE 32

Word to Introduce

factories - buildings where things are made.

General Information

In the United States, industrial wastes pollute the water at least twice as much as the wastes from all American cities combined. It takes 200 gallons of water to make one dollar's worth of paper. Polluted water emerging from a steel mill can carry deadly poisons. Cyanide-poisoned river water was fatal to minnows and other life in the Cuyahoga River in Ohio. Chemicals such as "PCB's" make fish dangerous to eat. Water treatment plants cannot remove all the poisons from contaminated water .

Answers

Yellow-brown waste should be coming out of the pipe and going into the river. People should not drink or swim in this water.

Activity (social studies, science)

Invite an official from the health department into the class and ask him/her about water sources and water problems in the school area.

Activity (social studies)

If possible, help the children to locate a factory near water. Write a class letter asking the factory officials how the plant is eliminating its wastes. Then determine if this method seems safe.

ACTIVITY BOOK PAGE 33

Word to Introduce

streams - very small rivers.

General Information

IT IS VERY IMPORTANT THAT CHILDREN UNDERSTAND THE CONCEPT OF GROUND WATER.

United States drinking water used to come from surface sources such as rivers, lakes, and reservoirs. Now half of the population uses ground water instead. Ground water is water that is deep under the surface of the land. Much of it is very clean; it has filtered through the ground and been underground for millions of years. Underground rivers and lakes connect some of these water sources.

Unfortunately, even some of this ground water is no longer clean. For example, one-fourth of all the towns in Connecticut have contaminated ground water.[7] At least half of all the ground water in the United States is threatened with contamination or is already contaminated.

Surface and underground water can be poisoned by the illegal dumping of hazardous wastes, by the leaking of containers of chemicals, and by the leaking of underground tanks of gasoline.

Poisons from "dumps" or landfills also seep down into the underground water systems. Road salt runs into streams and rivers. Chemicals used on farms seep into the ground.

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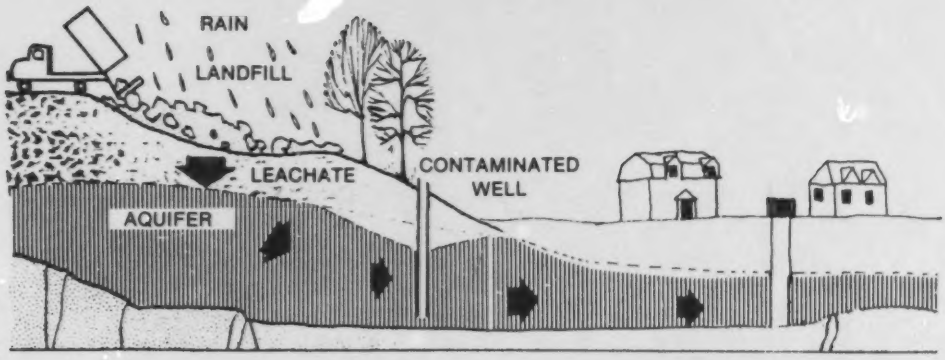
[7]Karl Wagener, "Guarding Our Ground Water," Connecticut Audubon Report, July 1981, p. 3.

Even homeowners with wells sometimes poison their own drinking water! Paint thinners, degreasers, or other synthetic organic chemicals may leak from septic fields into wells.

Draw the following diagram on the board or on a large piece of paper. Ask the children what "leachate," "aquifer," and "contaminated well" might mean. Leachate means something that filters down through the ground. An aquifer is an underground layer of rock or sand which contains water. A contaminated well is a man-made water supply that has been polluted. Show the children where the groundwater in the aquifer is.



Contamination of Ground Water by Leachate from a Landfill.[8]

Answers

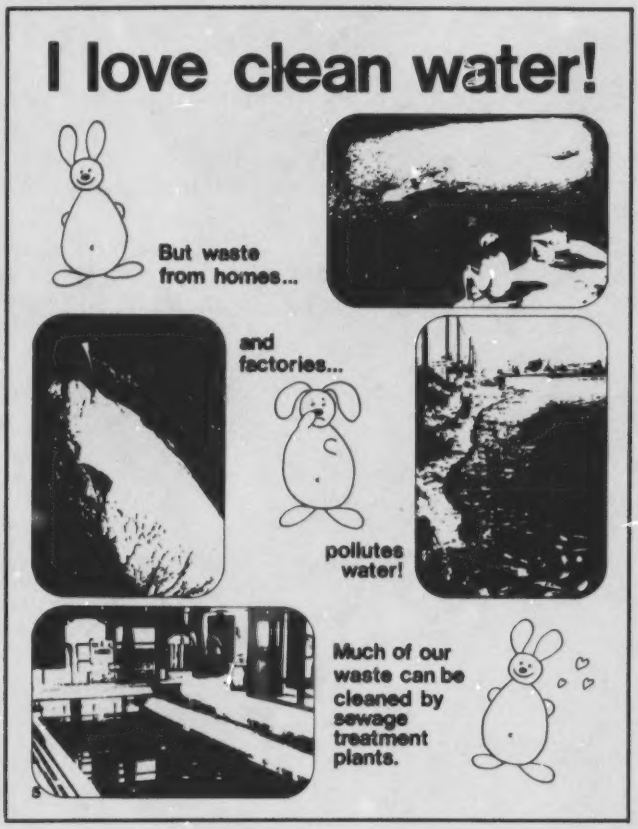
A blue line should be drawn from the house to a river and then follow the river and go into the ocean.

The house should be colored brown.

---

[8]Credit: The Wetlands Project, Massachusetts Audubon Society, Lincoln, Massachusetts 01773.

Display Poster 5. It shows polluted water and the interior of a sewage treatment plant.


I love clean water!
But waste from homes...
and factories...
pollutes water!
Much of our waste can be cleaned by sewage treatment plants.

Questions for the Children

1. How long has the water in the ground been there? (The water we use has been there for millions of years. In fact, the water which was in the pre-historic dinosaur period is still present--somewhere.)

2. Is there only a certain amount of water on the planet Earth? (Yes, we cannot add to the water supply in any significant way.)

3. What can we do to stop poisoning the water? (We must think about everything that we put down the drains of our sinks, washing machines, and toilets. We must think about our refuse and learn to dispose of it safely. We must try hard not to buy or use any kind of poison.)

4. What should we do if we see someone dumping poisons into a stream or a river? (The incident should be reported to the local health officer or United States Environmental Protection Agency division.)

Activity (social studies)

If possible, visit a small stream. Find the stream on a map. Locate its origin, its feeders, and its destination. Walk to the source of the stream if practical.

The children can wear old sneakers and long pants and walk in the water if it is not deep.

Dam the stream temporarily with a board, sand, or small rocks if it is permissible. Discuss how a series of dams can hold back water. Dams, irrigation, and other uses of water can cause a stream or river to dry up. Explain that this already has happened to the Colorado River; it presently ends about 20 miles from its original destination. In fact, only two percent of the rivers in the United States are free of dams or irrigational diversions.

Books for Adults

The Household Pollutants Guide. Albert Fritsch, ed., Center for Science in the Public Interest, New York: Doubleday, 1978. (This excellent guide describes polluting products in the home and their alternatives.)

Ecology at Home. Jacquiline Killdern, ed., 101 Productions, 79 Liberty Street, San Francisco, CA 94110, 1971. (This book tells how your housekeeping habits can help save the environment.)

Natural Formula Book for Home and Yard. Don Wallace, ed., Emmaus, PA: Rodale Press, 1982. (This comprehensive guide gives hundreds of recipes for safe, inexpensive cleaning products, beauty products, fertilizers, pest repellents, and other household needs.)

ACTIVITY BOOK PAGES 34 AND 35

Words to Introduce

sewer - a pipe used to carry water and waste.

sewage treatment plant - a place where dirty water is made cleaner.

General Information

Eight trillion gallons of waste water run through pipes and pour into the rivers, lakes, and oceans of our country each year. Sometimes this water is clean, but often it is not.[9]

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[9]John Luoma, "The $33 Billion Misunderstanding," Audubon, Vol. 83, No. 6, November, 1981, p. 112.

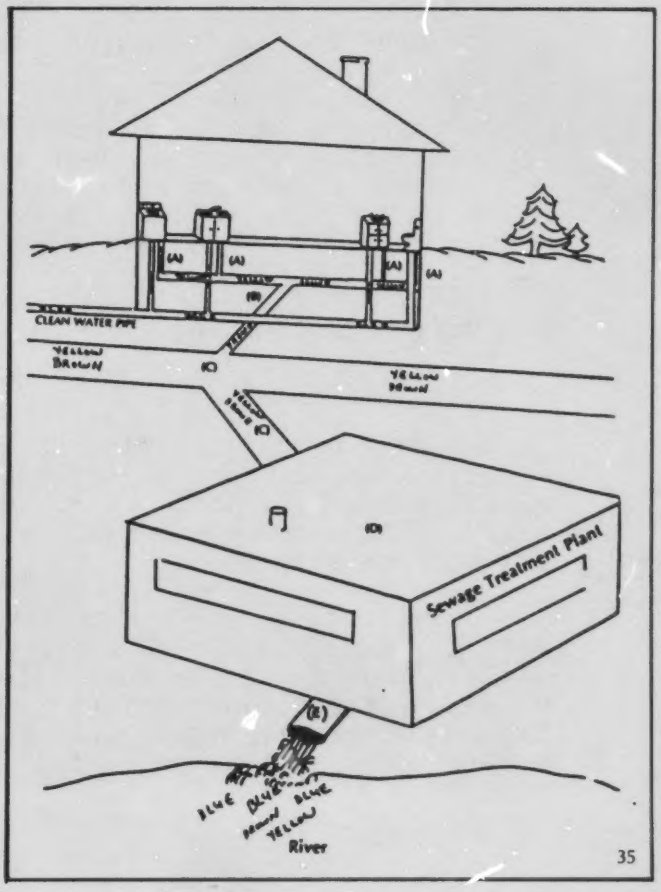
Most wastewater systems are built based on a design that is over 100 years old. Primary treatment filters out some solids. During the secondary treatment, living decomposer organisms break down organic wastes. Chlorine is added. The relatively clean result is discharged into a waterway. The sludge that is left behind is usually dumped or burned.

HOWEVER, EVEN AFTER THIS TREATMENT, SOLID MATTER, PHOSPHORUS, NITROGEN, HEAVY METALS, AND TOXIC CHEMICALS REMAIN IN THE WATERWAY. IN ADDITION, WHEN WASTEWATER SYSTEMS ARE OVERLOADED DUE TO HEAVY STORMS OR BREAKDOWNS, ABSOLUTELY RAW SEWAGE USUALLY POURS OUT.

However, there are treatment systems that can function more efficiently. One example is the Muskegon County, Michigan, Wastewater Management System. It treats wastewater and grows 80 bushels of corn per acre in the process.

According to the Journal of the New Alchemists, there are biological lagoon systems which contain aquatic plants that have proven able to remove or detoxify the majority of the most harmful components of modern-day wastes. These wastes include herbicides, pesticides, and heavy metals; this method is less costly than present types of management.

A research program in Canada is also turning sewage sludge into synthetic oil which can be used as an energy source.



35

Answer

These two pages may be difficult for some children and may, therefore, require adult help.

Activity (social studies)

Discuss the purpose and function of a sewage treatment plant. Then visit one. Be sure that your guide dwells on the general purposes and doesn't overwhelm the children with too many technical details.

Books for Primary Grades

Gutnik, Martin, Ecology and Pollution/Water, Chicago: Children's Press, 1973. (This interesting book describes three experiments about water pollution.)

Orlowsky, Wallace, and Thomas Perera, Who Will Wash the River?, New York: Coward-McCann, Inc., 1970. (This well-illustrated book describes how a sewage treatment plant functions. However, it does not deal correctly with chemical pollution.)

Simm, Seymour, Water on Your Street, New York: Holiday House, 1974. (Water pipes and sewers are the subjects of this interesting book.)

Books for Intermediate Grades

Berger, Melvin, The New Water Book, New York: Thomas V. Crowell Co., 1973. (This advanced book contains fascinating experiments, activities, and explanations about water supplies and pollution.)

Carlson, Carl Walter, Water Fit to Use, New York: The John Day Co., 1966. (This interesting, well-illustrated book discusses various water pollution problems.)

Pringle, Lawrence, Water: The Next Great Resource Battle, New York: MacMillan Publishing Co., Inc., 1982. (This book is a comprehensive, controversial, and interesting text for advanced readers about water problems in the United States.)

ACTIVITY BOOK PAGE 36

General Information

Water is a wonderful drink . . . and totally necessary. Explain that all soft drinks and juices contain water. However, anything but pure juice or milk may contain harmful additives and sugar. Clean water is a healthy drink . . . and costs very little for most people.

Adults take in five to six pints of water each day through eating and drinking. Demonstrate this amount to the children. Explain that a five percent loss of normal body water may make a person suffer hallucinations. People lost in the wilderness can live for several weeks without food, but they will die after several days without any water.

Activity (Math)

If the children understand fractions, ask them who weighs about 80 pounds. Explain that two-thirds of that weight is water. Ask the children how much the child would weigh if all the water disappeared from his or her body (27 pounds). 53 pounds of a child this size is water.

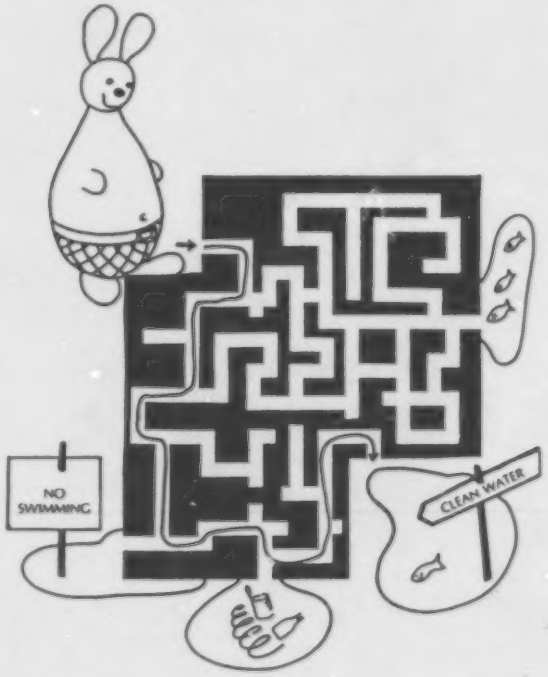
JELLY JAM'S PREVENTION

ACTIVITY BOOK PAGE 37

Answer

YOU can help to clean up the water. When it is clean, you will be able to swim in the rivers, lakes, or ocean waters near your home, and you will be able to eat fish from them.

Help me find my way to clean water.



Turn the page to find out how you can help to clean up the water.

37

ACTIVITY BOOK PAGE 38

Word to Introduce

showers - baths where one is sprayed with fine streams of water.

Answer

Musical notes should be drawn near Jelly Jam's mouth.

Encourage children to add to the pictures, especially if the additions pertain to conservation.

ACTIVITY BOOK PAGE 39

General Information

In ancient times, people used three or four gallons of water per day. Have the children measure four gallons of water. Help them imagine using this quantity for cooking, drinking, brushing their teeth, keeping clean, and disposing of wastes.

Modern man wastes a great amount of water. Each person now uses about fifty gallons per day. There are millions of people using billions of gallons of water each day. Each time a toilet is flushed, five gallons of water go down the drainpipe. Twenty or more billion gallons of water go down drains every day. Then the water often goes into a river--with or without treatment.

Answers

Review the charts with the children and show them exactly what to do. The information should be obtained at home by each student.

Questions for the Children

1. Why must we save water? (We must have clean water for drinking. If we use up the clean ground water and make it dirty, we will not have pure drinking water. Ground water cannot clean itself.)

2. How can we conserve water? (Take short showers; don't flush the toilet just to get rid of a piece of tissue; tell your parents about dripping faucets; use a cup to rinse your mouth while brushing your teeth; don't run tap water to get a cold drink.
   Remember that all these ideas also save money and energy.)

3. How can our families save water? (Use very little water to wash the car, and do it near growing plants; water lawns and gardens as little as possible; use mulch instead; wash full loads of laundry and use as little detergent as possible; put water savers in the toilet tanks, on the faucets, and on the shower heads.)

4. Many people wash their hair every day because they have seen ads on television. If we are supposed to conserve water, why do the ads encourage hair washing? (The companies want to sell more shampoo to make more money.)

5. In Boulder, Colorado, water meters have been put in people's homes. Now people are using 36 percent less water. Why are they using less water? (They are more aware of their water use; using water costs them money.)

6. Are there some places where neither surface nor ground water is used for bathing, washing, and flushing toilets? (Rain water falls on special white, clean roofs in Bermuda. Then it runs down clean pipes into big tanks underneath the homes.)

ACTIVITY BOOK PAGE 40

Word to Introduce

plastic - something that is not made of metal or wood. It is made by people and not found in nature.

General Information

People riding in boats often dispose of their waste by emptying it into the water. Because it disappears from their sight, they believe it has actually disappeared. This waste includes: beer and soft drink cans or bottles; plastic cups; incompletely burned fuel from motors; spilled oil and gasoline; and human waste from toilets that flush directly into the water.

This mistaken "out of sight, out of mind" belief is also held by people living in towns and cities. Garbage and human waste often empty directly into rivers and oceans. Sometimes the waste is taken away in boats and dumped in an offshore ocean area.

But even the huge ocean must be treated with respect. Vast quantities of sewage flushed into the ocean and refuse dumped into the ocean from ships create "dead seas" (pockets of water within the ocean) where no life survives. Oil leaking from ships or dumped when tankers are cleaned floats on the ocean surface;

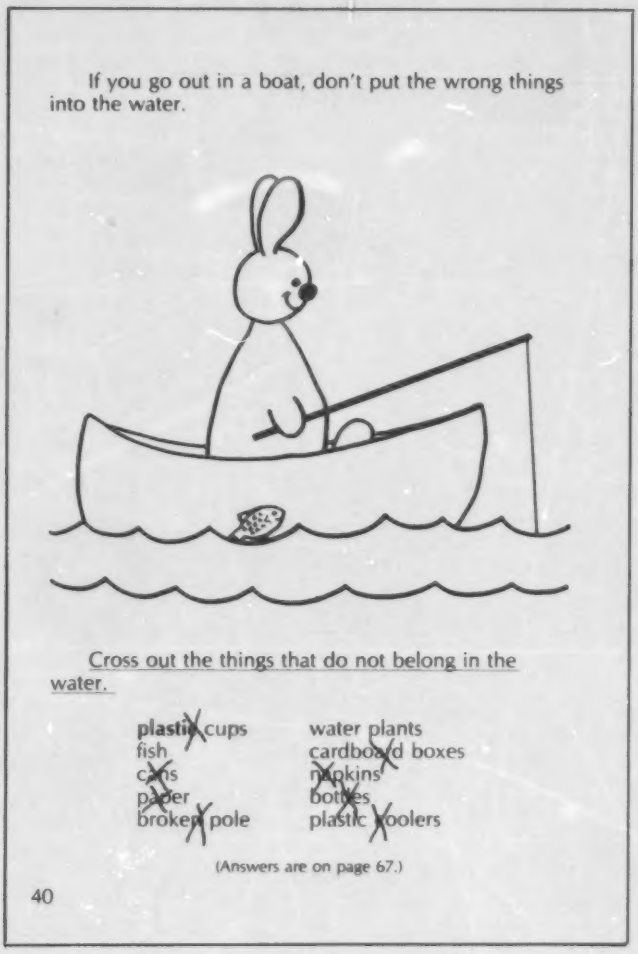
when it sinks, it kills everything in the water. It often reaches beaches hundreds of miles away.

Radioactive waste containers leak in underwater dumps, changing the plants and animals that live deep in the ocean.

Tell the children about Kontiki and Thor Heyerdahl's experience in the middle of the ocean, thousands of miles from land. At times he was completely surrounded by floating plastic residue and globules of oil.

Answers

Plastic cups, cans, paper, broken pole, cardboard boxes, napkins, bottles, and plastic coolers should be crossed out.



Question for the Children

Why do some people say that the world is one big ocean with some islands in it? (The oceans connect.)

See the following drawing by Athelstan Spilhaus.[10]

WHOLE OCEAN MAP

(A new view of the world)

Activity (science)

Subscribe to: The Cousteau Society
Box 2002, Grand Central Station
New York, NY 10164

The attractive and readable environmental children's magazine, Dolphin Log, will be included with a class or family membership.

Books for Primary Grades

Freeman, Don, Seal and the Slick, New York: Viking Press, 1974. (This fictional story by a famous children's author concerns water pollution.)

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[10]Whole Ocean Map copyrighted by Athelstan Spilhaus. Permission for use granted by the illustrator. Calypso Log, September, 1981.

ACTIVITY BOOK PAGE 41

General Information

Water is polluted in many different ways. Sometimes materials enter the waterways and nourish plant growth to such an extent that eutrophication takes place; the water becomes deficient in life-supporting oxygen. Household enzyme pre-soaks, bleaches, boosters, additives, and detergents are sources of water pollution. Many detergents were built around phosphate molecules; these substances act as fertilizers which nourish plant growth . . . stimulating algae development, weed growth, and slime buildup. Lakes with high concentrations of phosphates in them may look green or brown because of algae on the surface.

The best washing products are biodegradable (able to be broken down into organic substances). Plain old soap made from lye, fat, and water is still a good bet. Add washing soda for laundry if your water is hard.

Normal algae growth can be very beneficial in some situations. Astronauts may grow algae to produce oxygen and food for their own use in outer space.

Answers

People could learn that litter, too much road salt, chemicals, and poisons can hurt living things. People might also learn that children can really act to help the environment.

Play titles should be short and interesting. Important words should be capitalized.

Experiment: Growing Algae.

Does phosphate make algae grow faster?

Materials
2 large jars
pond or stream water
leaves or water plants
dishwasher detergent

Directions
Obtain water from a pond or a stream. Include dead leaves and green water plants in two jars. Place the water in a warm place in artificial light or sunlight for one week. Add some dishwasher detergent with a high phosphate content to quicken algae production in one of the jars.

Activity (drama)

Some children might enjoy writing a script for a play or making up a puppet show. An example follows:

SCENE: Small lake in a clearing at the edge of the woods.

Once clean and beautiful, the lake has become a dumping place. Paint cans, detergent bottles, old tires, papers, a rusty bedspring, a broken bicycle, a discarded baby carriage, and old garden tools are among the pieces of junk that have accumulated in the water and on the banks of the lake. A drainpipe from an old home also runs into the lake.

DIALOGUE AND ACTION

A single frog pokes his head up through the algae that covers the surface of the water. He croaks mournfully, calling for friends who have formerly lived in or near this lake.

At last a weak voice answers. Gasping occasionally, a fish complains that most of his family and friends have disappeared. He hopes they have found their way to a cleaner place upstream. Although he loves this lake, he sadly says that he, too, will soon have to leave. He wonders aloud what makes that thick scum on top of the water. No longer can he see sparkling shafts of sunlight penetrating all the way down to the sandy bottom. Now the water is murky--the lake bed black and muddy.

The frog sympathizes. He isn't certain, but he suggests that perhaps all those strange objects that keep piling up in the lake have somehow poisoned the water. Some liquid from leaking cans has made his eyes hurt, and the water that comes out of the pipe does not smell good.

Suddenly a sharp cry is heard. The frog investigates and finds a young deer with her foreleg caught in a twisted bedspring. The deer cries in pain and fear as she calls for help. The frog cannot free the deer. One by one, animals of the field and forest come cautiously to the water's edge. Squirrel, skunk, snake, raccoon, turtle, fox, birds, and bear all watch the deer but none can help.

A faraway sound grows louder as it comes closer. Finally, the frog shouts in panic that the noise is people's voices, and people are the creatures who have dumped all the debris here. Most of the small animals run to hide in the woods. Children's laughter is heard. The squirrel announces from his lookout perch high in a tree that these are not ordinary people who are approaching. They are FRIENDS! They are (teacher's name, grade, class) from (school's name) accompanied by Jelly Jam. The squirrel has played in their schoolyard, and they have even given him peanuts.

The other animals are skeptical and remain hidden. Soon the children see the frightened deer. They talk gently to her while they carefully free her leg. Then they begin picking up the trash. The animals peek from their hiding places. When all the rubbish has been collected, a big truck comes across the clear-

ing. Two friendly workers load all the junk on the truck and drive away with it.

Then the children call the town health department. The people who work there ask town workers to take away the leaking cans. They also talk to the home owner about the pipe. She has a septic field built to clean the dirty water; the pipe is taken away.

Children and teacher talk about the people who can be called on to help restore the lake to its original condition. Some of the animals tell how the lake is important to them and why they are so grateful to have it clean again. Each animal makes appropriate noises and does a little dance for (teacher's name and class).

WATER POLLUTION REVIEW

ACTIVITY BOOK PAGE 42

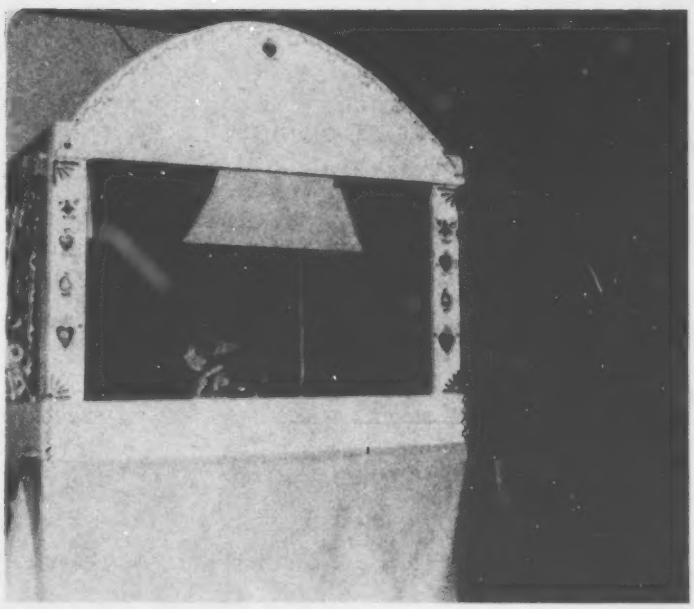
Answers

1. opened can
2. fish
3. polluted river
4. clean water

Activity (social studies, drama)

Using the technique of role-play or puppetry, several children could be the directors of a polluting company who are being challenged at a meeting by a town environmental group or by angry parents who are worried about their children's health.

The children who are directors may find it difficult to support their arguments. The directors may talk about the loss of jobs and tax money for the town if the company closes.



Activity (music)

The importance and beauty of clean water has long been acclaimed through music of all kinds. Handel's "Water Music" might inspire creative dance or free-flowing art work.

The old folk ballad "Shenandoah" would illustrate the pioneers' love of a waterway. ("Shenandoah." How the West Was Won. RCA Victor Recording.)

Activity (language)

Students might enjoy creating a book for the school library. Stories telling what the children themselves have done to help solve water pollution problems and to conserve water can be illustrated. When bound or stapled for library use, the stories should tell what the problem was, why it was a problem, and what the children did to find a solution to the problem.

Activity (social studies)

The 1977 Report for The Council for Environmental Quality lists 50 lakes, rivers, and streams that were once severely polluted but are now greatly improved. For instance, Pearl Harbor is now open to the public for swimming and fishing for the first time since World War II. Have the students find out about these pollution "success stories." The address is: 722 Jackson Place, N.W., Washington, DC 20006.

Activity (science)

To prepare the introduction of the next section, ask the children how water pollution and land pollution might be related. Explain that water mixing with refuse leaks poisons down into the earth and into the underground water. Acid rain 'releases' some metals into the soil.

PART FOUR: LAND POLLUTION

General Information

This section of the workbook introduces the topic of land pollution. Most children are familiar with the litter problem, and they can do much to ease the trash burden.

For independent study, difficult words might be:

refuse	magazine
weigh	aluminum
flour	materials
metal	melt
liquid	manure
compost	

Adult supervision may be needed for the experiments on pages 44, 45, and 49 and the compost pile on page 53.

Books for Adults

Berry, Wendell, The Unsettling of America: Culture and Agriculture, San Francisco: Sierra Club Books, 1977. (A personal, dramatic investigation into the way we use our land and how that use affects our lives is the subject of this important book.)

ACTIVITY BOOK PAGE 43

Word to Introduce

refuse (ref-use) - anything thrown away which seems to be useless.

magazine - stories and/or facts in a very thin book with a paper cover.

General Information

The amount of rubbish is increasing more than twice as fast as the population. Throwaway products are becoming more and more common. Many new products are not biodegradable. Aluminum cans and plastic bottles are almost immortal. Some heavy, clear plastic bottles give off dangerous hydrochloric acid fumes when burned.

Cities and towns are running out of dumping sites. They are using estuaries (the mouths of rivers), marshes, and flood plains. In many cases, the damage is irreversible. According to the Cousteau Society, the average U.S. resident will throw away 27,000 bottle caps in his or her lifetime alone! New York City garbage would make a mile-high mountain in just one year.

Help the children to be more conscious of waste. If they used two paper towels to dry their hands, maybe they did not use one completely. Instead of using two sheets of writing paper in class or at home, try to have them use both sides of one sheet.

IT IS IMPORTANT TO REMEMBER THAT ALL CONSERVATION EFFORTS NOT ONLY SAVE RESOURCES BUT ALSO SAVE MONEY.

Answers

X's should be put next to anything thrown away yesterday; red circles go around those things that could have been fixed, used again, given away, or sold.

A child's daily refuse might consist of paper napkins, scratch paper, tissue, paper towels, gum or candy wrappers, soda bottles, and packaging on any item he or she might have purchased.

Questions for the Children

1. Discuss ref-use and re-fuse. What is the difference between the words? (The accent mark and syllable division)

2. Can we link the meanings together in some way? (Re-fuse to make ref-use!)

Books for Intermediate Grades

Elliott, Sarah, Our Dirty Land, New York: Julian Messner, 1976. (This factual book discusses litter, solid waste, oil pollution, strip mining, pesticides, and road-building.)

ACTIVITY BOOK PAGE 44

Words to Introduce

weigh - find out how heavy something is.

aluminum - a light, silver metal.

General Information

Each person in the United States (including babies and children) throws out 3½ pounds of waste each day. Waste or refuse includes garbage and trash. If industrial wastes, sewage, junked cars, and construction rubble are included, the total waste amount rises to three to four billion tons each year in the United States alone. To understand "a ton," tell the children that a school bus weighs seven tons.

The facts on this page should be collected at home by each student. Discuss how the children might be able to reduce the amount of refuse they and their families throw away each day. IDEALLY, EVERYTHING BROUGHT INTO THE HOME SHOULD BE CONSIDERED FROM THE POINT OF REFUSE POTENTIAL. Refuse potential is an important consideration on any space flight. Some people look at this planet as a fragile space ship.

Answers

Children may need help multiplying the figures.

1. one hundred years

2. plastic cup

Experiment: Lunchroom Waste.

How much waste do school lunches create in one year's time?

Have each child in the class put his refuse into a pre-weighed box or large plastic bag at the end of the school lunch period.

1. Weigh the filled box or bag.

2. Subtract the initial weight of the box or bag.

3. Multiply that net weight by the number of classes in the school.

4. Multiply that total by the number of days that school is in session and lunch is served.

5. The total figure will be the amount of refuse from the lunch meals in just one school in one year.

6. Have the children record their results in their scrapbooks.

Books for All Children

Shanks, Ann Zane, About Garbage and Stuff, New York: The Viking Press, 1973. (This book discusses recycling. Illustrated with excellent photography, it is ideal for intermediate grades but could be read aloud to second and third graders.)

ACTIVITY BOOK PAGE 45

Word to Introduce

flour - something soft and fine that is used to make bread, cake, and cookies.

General Information

Many of the materials that we use in our daily lives contain poisons and are hazardous. Antifreeze, toilet bowl cleaners, furniture polishes, oven cleaners, paint removers, insecticides, weed killers, and flea powders are a few common products. Throwing these poisons in the dump will not make them go away. We should try not to use poisonous substances. Using natural products and "people" energy can reduce the use of many of these poisons.

Some of the most dangerous and hard-to-get-rid-of wastes come from pesticides used in inorganic farming and chemicals used in lumber mills and in photographic studios. "Dry cleaners, auto repair shops, printers, and even homeowners can all be small generators of hazardous waste and yet know little or nothing about proper treatment and disposal methods." [11]

It is important to create places where hazardous wastes can be made safe. Many wastes could be made harmless by treatment with microbes or ultraviolet rays. Some wastes could be burned in special ovens. These processes cost more money than dumping. As consumers, we must be ready to pay the costs if we wish to continue our lifestyle.

However, some companies do not want to pay to get rid of their wastes safely. Sometimes wastes are dumped in stream beds (e.g., Love Canal) or along roadsides at night. It is important to be alert to the activities of anyone using any kind of poisonous chemicals.

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[11] Exposure, December, 1981, No. 13, Environmental Action Foundation, Washington, D.C.

Answer

Pink or light red.
See picture.

Activity (science)

In 1983 the Massachusetts Public Interest Research Group found toxic art and craft supplies in use in 21 school districts across the state. Some of the materials were even labeled "non-toxic."

Investigate your school craft room for safe and unsafe products such as certain adhesives, paints, asbestos products, varnishes, lacquers, turpentine, plastics (if burned), and glazes with lead. Reading labels and understanding them is a prerequisite for good health in the 1980's and 1990's.

Ask a chemist or the science consultant from the state board of education to come into the classroom if you are not sure of the toxicity of certain materials.

JELLY JAM'S PREVENTION

ACTIVITY BOOK PAGE 46

General Information

This page is one of the most important ones in the book. Jelly Jam's toy has broken just after he bought it! It was not well-made. If Jelly Jam had saved his money and bought a quality product, the result would have been a happier one!

THE VALUE OF "BUILT-IN OBSOLESCENCE" MUST BE ELIMINATED. MANY PRODUCTS ARE NOT WELL MADE. MANUFACTURERS WANT THEM TO BREAK SO CONSUMERS WILL BUY NEW PARTS OR PRODUCTS.

We also must become less materialistic and more concerned with the quality of our lives rather than the quantity of possessions--three-fourths of which we throw away each year.

Answer

The children are invited to color Jelly Jam sad. This is a good opportunity to discuss colors and how they make people feel. Black and dark, cool colors often make people feel sad while bright, warm colors may make people feel happy.

Questions for the Children

1. Would you rather have two toy cars that break in a few weeks or one car that lasts for a year? Why?

2. How can you tell which toys will last a long time? (They will be made of heavy plastic, wood, or metal. The joints will be firmly fixed together.)

3. Many toys that are advertised on television appear durable and exciting. How can you find out if the advertisement is misleading? (Try a friend's toy first. Ask your friend about the toy. Look closely at its construction.)

4. Many people prefer wooden or metal toys rather than plastic. Can you guess why? (Plastic is made from oil--a non-renewable resource; its use makes us dependent on other countries. The manufacture of plastic also causes cancers in some of the workers. Also, plastic toys are less durable than wooden or metal ones; and plastic does not break down easily when it is discarded.)

ACTIVITY BOOK PAGE 47

Words to Introduce

materials - what a thing is made of

metal - something hard that shines, gets hot or cold, and can be melted. Gold is a metal.

Answers

5 paper
1 metal
3 light plastic
2 hard wood
4 cardboard

Question for the Children

How can we take care of our toys so that they will last longer? (Bring them indoors after playing with them. Put breakable toys away when younger children are around. Repair toys as soon as possible before there is more breakage and the parts get lost.)

ACTIVITY BOOK PAGE 48

General Information

Cycle means "a course of events that recur regularly and usually lead back to the starting point; a circular arrangement." (Webster)

Recycle suggests a series of events moving back to the starting point and then occurring again. A bicycle has two "circular arrangements."

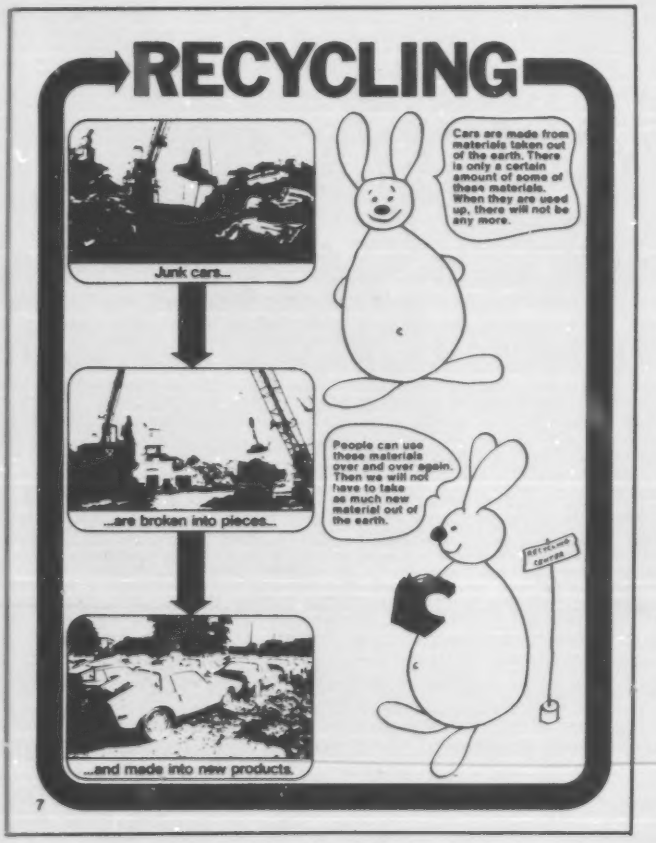
The recycling of newspaper (after collection by various groups) would involve the return of the newspaper to a company where it would then be converted into new paper products. Wallboard and pressed board furniture are two types of recycled paper products. Scientists are working on recycling many other kinds of materials. Used cans and glass containers (sorted by color) are recycled into the same form by some companies.

Recycling saves energy, makes less refuse, uses less water and creates less air pollution; it can help to create jobs--especially in cities. Some towns also earn income by selling recycled refuse. However, we have not made much recycling progress in the United States. On the other hand, Japan has increased its recycling of materials--metal, paper, glass, and plastic--from 16% in 1974 to 48% in 1978. There is a saying in Japan . . . "This year's Toyota is last year's Buick."

Answers

Smiling faces should be drawn on Jelly Jam's pictures.

Put up Poster 7. It shows how recycling works.


RECYCLING
Junk cars...
Cars are made from materials taken out of the earth. There is only a certain amount of some of these materials. When they are used up, there will not be any more.
...are broken into pieces...
People can use these materials over and over again. Then we will not have to take as much new material out of the earth.
RECYCLING CENTER
...and made into new products.
7

Activity (science)

Ask the children to draw a picture or make a bulletin board that shows how nature recycles.

Activity (social studies, science)

Visit a landfill where recycling takes place.

Activity (social studies)

Try to visit a recycling center and/or a plant that recycles products.

Activity (social studies, science)

Eight success stories in the field of recycling and litter reduction can be obtained by sending for "The Cleaning of America," Kaiser Aluminum, Dept. TMEN, Room 1127, 300 Lakeshore Drive, Oakland, CA 94643.

Activity (social studies, science)

For free materials, write: The Aluminum Association, 750 Third Avenue, New York, NY 10017, and order the "Filmstrip and Teacher's Guide to Recycling." Grades 1-6.

Activity (language)

Ask the children to write a story about a piece of aluminum. Tell about its different recycled shapes and travels. Use the first person.

Activity (social studies)

Write the mayor's office in Islip, Long Island, to find out about an excellent community recycling program. People must separate their newspapers, cardboard, glass, and metal from other household wastes. Find out how and when the program is operated and if it makes money for the town.

Activity (language)

If you do not have a recycling program in your area, write a letter to the editors of your local newspaper. Tell them that money could be earned and pollution could be reduced if a recycling program were initiated.

Books for Primary Grades

Gutnik, Martin, Ecology and Pollution/Land, Chicago: Children's Press, 1973. (This fascinating book describes experiments such as building an ecosystem, making a landfill, and recycling paper.)

ACTIVITY BOOK PAGE 49

Words to Introduce

melt - to soften something so that it can be poured.

liquid - something that flows easily; something that can be poured.

General Information

This is a simple experiment that illustrates how a product can be re-used and changed into a new form through heat. It should also be stressed that very intense heat purifies the product. The children can even eat the results of the experiment!

Experiment: Recycling Chocolate.

Can a substance change its shape without changing its contents?

Materials
chocolate bar
spoon
pan
hot plate or stove
Pyrex dish

Directions
Follow directions in the Activity Book.

Answer

heat X

ACTIVITY BOOK PAGE 50

General Information

Recycling is only a partial solution to the waste problem, however. Bottles manufactured to be re-used are the most efficient use of resources. The energy used to melt glass is greater than that used to wash returnables.

Another solution is to try not to buy products that are over-packaged. Buying fresh foods that are not wrapped in plastic is preferable. Plastics are not biodegradable; using paper bags or one's own bags is preferable if your market uses plastic bags. Growing and making your own food also reduces waste.

Answer

The presents and Jelly Jam's shopping bag should be colored.

Questions for the Children

1. Is there anything in your home which could be re-used instead of thrown out?

2. Have you ever bought anything that was unnecessary because something else could have been used in its place? If so, what?

3. If your answer to Question 2 was "yes," then why do you think you bought that item?

4. Referring to Question 3, was that a good reason? If not, why not?

5. Refusing packaging in stores is another way to reduce garbage. What kinds of packaging can you refuse?

Activity (general)

Try to get the children to cut down on the use of paper in the classroom. For small assignments, cut sheets of paper in half.

Activity (art)

Paint 16" x 19" pieces of inexpensive masonite with slate paint. You can get 15 pieces from one 4' x 8' sheet of masonite.

Make old-fashioned individual slates with each child. The student can practice math and handwriting using a piece of chalk. These slates are practical, save paper, and have a high degree of kinesthetic usefulness.

ACTIVITY BOOK PAGE 51

General Information

Used clothing and furniture are re-used through agencies such as the Salvation Army and Goodwill Industries which aid needy people. Old toys are often welcomed by prison associations which fix them and give the toys to the children of prisoners at holiday time.

Magazines can be traded among families; they are enjoyed by people who wait in doctors' offices, laundromats, barbershops, and hairdressing salons; they are greatly appreciated by people who live in old-age homes, who are patients in hospitals, and by people who use libraries.

Answer

Everything but stores should be circled.

Activity (art)

Save greeting cards of all kinds. Cut off the message. Re-use the picture by pasting it on a gift. Write the message within the picture or around its edges.

Activity (art)

Use old newspapers for making environmental puppets, jewelry, containers, or scenes of papier mache.

How to make papier mache:

a. Wet several sheets of newspaper.
b. Rip them into small pieces.
c. Mix the pieces with about 1 cup of wallpaper glue (wheat paste) in a bowl.
d. Gradually add a small amount of water.
e. Stir until the mixture sticks together.

Older children can apply short newspaper strips dipped in the paste over the pulp to make larger and more complex objects.

Books for All Children

Lefkowitz, R.J., Save It! Keep It! Use It Again, New York: Parents' Magazine Press, 1977. (This excellent, readable book discusses conservation and re-using materials for grades 3 and up.)

Books for Children and Adults

Rencyclopedia, The, New York: Houghton-Mifflin Co., 1976. (This book describes how to re-use materials creatively.)

ACTIVITY BOOK PAGE 52

Words to Introduce

manure - droppings from animals.

compost - something that is made when vegetable garbage is mixed with manure.

General Information

One of the greatest problems in the world today is erosion--the loss of top soil. Top soil forms a fertile carpet over less productive soils; but in most places it is only several inches deep. Wind and floods drive it away. Depleting it further are: building, paving, strip-mining, and careless farming practices

such as poor irrigation. The poorer subsoils become the tillage layer with resultant lower production.

It is extremely important to build our topsoil. Adding organic wastes of all kinds helps water-retention capacity, aeration, and nutrient content. A compost pile may be located in a wire enclosure. If it is in a sunny place, it should be partially covered in the spring and fall to retain moisture. The larger organic layers can be composed of leaves, grass clippings, vegetable scraps, weeds, wood ashes, and wood shavings, all combined with manure, if possible.

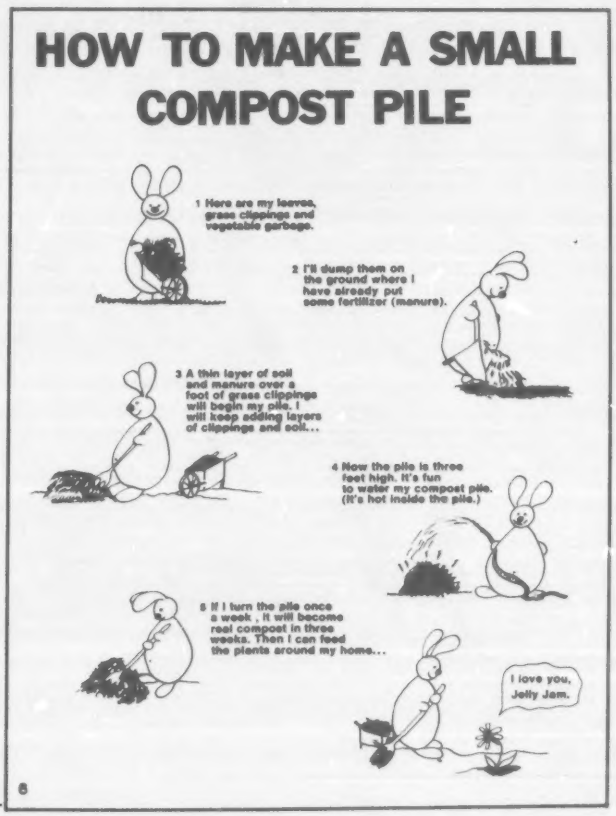
Re-using organic wastes in this constructive manner also reduces the refuse problem. In parts of Hungary people take their refuse to city composting centers where it is separated from the iron, aluminum, and glass; then it is sold.

Composting toilets are used all over the world; they help to save water and to add clean nutrients to the soil.

Answer

Red hearts should be drawn around Jelly Jam.

Put up Poster 6. It shows how to make a small compost pile.


HOW TO MAKE A SMALL COMPOST PILE
1 Here are my leaves, grass clippings and vegetable garbage.
2 I'll dump them on the ground where I have already put some fertilizer (manure).
3 A thin layer of soil and manure over a foot of grass clippings will begin my pile. I will keep adding layers of clippings and soil...
4 Now the pile is three feet high. It's fun to water my compost pile. (It's hot inside the pile.)
5 If I turn the pile once a week, it will become real compost in three weeks. Then I can feed the plants around my home...
I love you, Jelly Jam.

ACTIVITY BOOK PAGE 53

Answer

A well-mixed compost pile should be colored dark brown. A few greenish areas would indicate new material added to the pile.

Activity (social studies, science)

Making a compost pile in a container on the school grounds or at home is an interesting project. School food waste could be used after bones and meat scraps have been removed. The result can be put around school plants or packaged and sold at a school fair.

Activity (science)

Another method to avoid topsoil loss is to grow perennial plants, especially trees. In the Northeast part of the United States, where every field naturally reverts to a forest, tree farming makes sense.

The children may enjoy planting a tree at school or at home. Choose a hardy tree which produces food that people can eat--such as nuts or persimmons.

Questions for the Children

1. What can trees do for people? (They can block the wind and produce food such as nuts and fruits. Their roots and stems hold the topsoil. Trees control and purify water, filter dust and odors, and provide shade and homes for animals.)

2. Why is a tree that produces food a good gift? (It is useful, will last a long time, is unusual and pretty.)

Activity (science)

Find a dead tree. See what creatures live in it or have lived in it. Make an exhibit using part of a dead tree. The children can draw the different animals who have lived or eaten in the tree. Discuss why some dead trees should be left standing in the woods. (Enemies cannot reach as many creatures. Standing trees rot more slowly than trees lying on the ground.)

Activity (social studies)

Find out about Davis, California (95616). It is a town of about 35,000 people. Much of the community planting is edible. Each district has a communal compost heap.

Books for Primary Grades

George, Jean, A Hole in the Tree, New York: G.P Dutton, 1957. (This award-winning primary book tells about all the creatures who live in an old tree.)

Silverstein, Shel, The Giving Tree, New York: Harper and Row, 1964. (This beautiful short story is about a boy and a tree. It can be made into a wonderful dramatic presentation.)

Books for Intermediate Grades

Jaspersohn, William, How the Forest Grew, New York: Greenwillow Books, 1980. (The life cycle of the forest is clearly described in this charming book.)

Books for Adults

Creasy, Rosalind, The Complete Book of Edible Landscaping, San Francisco: Sierra Club Books, 1982. (This thick, beautiful paperback is full of unusual and useful landscape ideas.)

Films for Children

"Organic Gardening: Composting." Bullfrog Films, Oley, PA 19547. (This is a short demonstration film for grades 3 to adult.)

LAND POLLUTION REVIEW

Activity (social studies)

To review the issue of land pollution, find out what each child may have done during the past week to reduce pollution of the land--recycling, refusing packaging, taking care of toys, buying carefully.

Activity (language)

Some children may want to create their own crossword puzzles using the words recycle, compost, re-use, plastic, waste, refuse, garbage, and aluminum.

Activity (art)

Ask the children to draw a picture of an important contemporary garbage problem as it will appear in 20 years if nothing is done.

SPECIAL SECTION: POPULATION

General Information

Note: The following points must be made with extreme care so that the feelings of children from large families will not be hurt. Explain that times are changing; resources are more limited; and we now know that Earth is really a fragile type of "spaceship."

The number of people and how they live directly affect the pollution of our air, water, and land. Try to give the children some idea of population growth. Conservative figures estimate 300 million Americans by the year 2000.

One way to illustrate population growth would be to draw a stick figure on the board every 16 seconds for 2 minutes or more. Every 16 seconds a new person is added to the American population. (This is a net number, taking deaths into account.)

Questions for the Children

1. What might our community look like in the future? (Rural towns may become apartment cities. Crowded cities might become unpleasant places in which to live as some areas already are. There would be little or no open space.)

2. Ask the children if anyone has seen animals reacting in overcrowded situations at kennels, zoos, museums, farms, or pet shops. How do these animals behave? (They may have health problems, be nervous, and act aggressively. Experiments prove that mice who are well-fed but crowded show unusual behavior. The mice fight; mothers and fathers may eat babies; some mice will not mate at all and stay by themselves.)

3. What kind of homes might we live in? (Single family dwellings would be rare. High-rise apartments might be standard.)

4. What area would be used for recreation? Where would children play? (There might be very few fields, woods, or empty lots. Unless drastic changes in thinking and planning occur, there will not be sufficient park area.)

5. How might our schools be different? (They would be very crowded. Many planners want schools to be open at night and during vacations.)

6. What might happen to our resources such as water, food, and building products if too many people want them? (We may run out of them.)

7. What should planners be aware of as they plan now for the cities of tomorrow in which we may all live? (They should think about open space, recreation areas, and parks which would be convenient to every dwelling; safe walkways to schools and places of business; new methods to transport people and goods efficiently and safely; schools which can be utilized effectively 100% of the time; and dwelling units which allow for optimum heating, natural cooling, and privacy.)

8. Why should population growth be limited? (Help the children to understand that they, their children, and their grandchildren can have and enjoy more resources if people have smaller families. With fewer people using up limited resources, there would be more open space. Fewer people would need fewer roads, cars, and buildings, etc. Fewer people would use less fuel and electricity. There would be less trash and less noise. POLLUTION IS CAUSED BY PEOPLE. Too many people is one reason for too much pollution.)

9. How can population growth be discouraged? (Population growth can be limited through a government incentive such as a tax on each child. Present tax exemptions for dependents also encourage population growth.

Social pressure can influence family size. Advertisements on postage stamps picturing a family of two children are examples of subtle social pressure.

China is encouraging one-child families. Couples who promise to have only one child receive higher salaries, better education, better job opportunities, and more food.)

Activity (social studies)

Have each child or groups of students plan an ideal city. Using blocks, small cardboard boxes, or scraps of wood from a carpenter or lumber company, they should plan to meet the human needs of food, shelter, clothing, recreation facilities, essential services, and transportation. The model city should allow for privacy.

Activity (social studies)

Invite planners to speak to the class. Tell the children that as adults they can work with community planners on committees to change cities into more ideal places to live.

Books for Primary Grades

Burton, Virginia, The Little House, New York: Houghton-Mifflin Co., 1978. (This award-winning story describes a house that is built in the country. The city slowly grows up around the house; it falls apart until it is moved away.)

Ross, Pat, What Ever Happened to the Baxter Place?, New York: Pantheon Books, 1976. (This book is a fictional story about a changing neighborhood that raises questions about money versus peace.)

PART FIVE: MORE IDEAS

Activity Book pages 54-57 are very important pages and probably need adult direction. New words are enforced, representative, senators, taxes, and medicine.

Pages 58-61 act as a review of the material in the Jelly Jam Activity Book. New words are ecology and pollen.

ACTIVITY BOOK PAGE 54

General Information

"Cleaning up" our earth is everyone's business and responsibility. The doctor, lawyer, store owner, teacher, homemaker, mechanic, computer expert, nurse, gardener, and farmer all contribute to pollution and can help to control it. All of us--children and adults--must examine our lives to see in which ways we can change our lifestyles to create a healthier, safer world.

Persuading people to change is an art. This page might stimulate a discussion on how to change opinions.

Answers

The book titles should be written on the lines. The first letters of the important words should be capitalized.

The child should circle as many topics as he or she might like to investigate.

Activity (language)

Children may be interested in learning how to effectively change people's opinions. Some suggested steps follow:

a. Identify the problem clearly in your own mind.
b. Know the facts involved.
c. Form your own opinion clearly.
d. Choose a good environment for discussion.
e. Allow enough time for an exchange of ideas.
f. Learn about the other person's opinions first.
g. Be a good listener.
h. Discuss points on which you agree first.
i. Be polite.
j. Leave the most difficult differences for the end of the discussion.
k. Use specific and concrete examples.
l. Show agreement when honestly possible.
m. Try to find solutions that are advantageous to the other person (lower costs, increased income, larger markets, better health.)

n. Help the other person to "save face" as you are changing his or her opinion.
o. Avoid causing embarrassment.

Activity (language, drama)

Role-playing is an excellent technique to teach about environmental problems and changing opinions. Have various students form teams. Use the following examples:

For Primary Grades

Situation: Mr. Smith runs a small store. The candy in his store has a red dye in it that might be dangerous to children. Susan has found some other candy that does not have that red dye in it at another store much further away. How might Susan get Mr. Smith to carry the healthier candy that she likes better?

For Intermediate Grades

Situation: Mr. Jones is a farmer. He sprays his fields with dangerous chemicals. Jane lives near his farm. She has heard her parents talking about the chemicals and their effects. Jane has headaches after each spraying, and so do her brothers and sisters. Jane's family used to have a hive of bees, but all the bees died. What can Jane do to get Mr. Jones to stop spraying?

Ask the class to decide which are the most convincing teams.

Activity (language, drama)

One can also effect change through consumer action; purchasers can get together and decide what to buy or what not to buy. Such action has taken place effectively against the Nestle Company. Workers for this company have been selling milk formula to mothers in very poor countries. These mothers do not have clean water with which to mix their babies' formulas. The formula costs a lot of money. The mothers put too much water in the milk powder trying to make it last longer. The babies get sick from the water and from having such weak food. If the mothers nursed their babies (gave them their own body milk), the children would be healthier, and many fewer babies would die.

Many people are upset about what the Nestle Company has been doing. These people are not buying any Nestle products. Therefore, the Nestle Company is making less money. Hopefully, the company will stop selling these formulas to very poor people.

Situation: Mrs. Brown runs a pharmacy that sells toys. Tom likes to go to see the toys, but Mrs. Brown is not nice to children and speaks unkindly to them. What can Tom do about this problem using consumer action?

Activity (social studies)

Ask the children if any of them have ever stopped going to a store because they did not like something about it. Find out if buying habits were changed; see if any "consumer action" was taken.

Activity (language, drama)

Puppetry is another medium for working out the pros and cons of difficult environmental problems.

Act out short plays in which someone's health is threatened by a business waste problem, factory fumes, superhighway exhaust, or an overflowing septic field.

Activity (art, music)

Public opinion can also be influenced by a song or a picture. The folk song, "We Shall Overcome," became a symbol for the liberation rights of black people during the sixties. A single photograph of a young girl running from a napalm explosion helped to turn the tide toward the ending of the Viet Nam War. Encourage the children to make up a song or take photographs of conservation projects that interest them.

Books for Adults

Carnegie, Dale, Effective Speaking, New York: Association Press, 1972. (Pages 159-170 discuss the art of convincing.)

ACTIVITY BOOK PAGE 55

Words to Introduce

enforced - to have made something happen.

representative - one of the leaders of our country who works in the United States House of Representatives.

senators - the leaders of our country who work in the United States Senate.

General Information

Special emphasis should be given to the role of the citizen in influencing lawmakers. If the children can understand that they can play a role in influencing law-making, the adult should feel that he or she has passed along a very important message!

Our country is just beginning to realize the importance of preserving the environment. Heretofore, we believed the environment had no limitations. New laws have now been passed, and new agencies have been formed to begin to deal with our immense environmental problems. However, some of these laws are not enforced, and the agencies are not doing their jobs effectively.

Elected lawmakers do listen to their constituents. While children are not yet voters, they do reflect public opinion and represent future voters. WRITING A LETTER TO AN IMPORTANT PUBLIC OFFICIAL IS A GOOD LESSON IN DEMOCRATIC ACTION.

Officials who should be interested in public opinion would be governors, commissioners of agriculture, commissioners of natural resources, directors of state boards of fisheries and game, directors of water resources commissions, the directors of state environmental protections and health agencies, and house and senate representatives in state and federal legislatures.

Answers

The names and addresses of the mayor or first selectperson, the governor, and the federal representatives and senators should be written on the lines.

Activity (social studies)

Illustrate the governmental system by drawing three circles on the board--one for the town or city, one for the state, and one for the country. Explain briefly that there are major elected officials for each area.

If possible, bring up an environmental problem and see if the children can identify the governmental area in which it belongs. Example: A chemical factory is producing a terrible smell, and it is giving you a headache. Which circle would show the area where an official should take care of the problem? (The town circle. However, the state circle would probably become involved since officials have access to superior testing equipment and enforce state laws.)

Activity (social studies)

Invite an official who is interested in improving the environment to come and speak to Jelly Jam's class. Try to have the person stress what the children can do.

Activity (social studies, language, drama)

Discover and research a local environmental problem. Discuss solutions to it. Write a class letter to the elected official who can best help to solve the problem. If the children are interested, publicize the problem. Display posters that the students have made and/or make a simple slide show and tape recording for parents or town groups. Senior citizens are often a wonderful source of knowledge and energy.

Books for Intermediate Grades

Adler, Irving, The Environment, New York: The John Day Co., 1976. (This useful and interesting book describes food chains, natural cycles, population limits, and polluted air, water, and land.)

Bixby, William, A World You Can Live In, New York: David McKay Co., Inc., 1971. (Pages 38-92 are concerned with government action and what students can do.)

Pringle, Lawrence, Lives at Stake, The Science and Politics of Environmental Health, New York: Macmillan Publishing Co., 1980. (This book is a fascinating study for advanced readers.)

ACTIVITY BOOK PAGES 56 AND 57

Words to Introduce

taxes - money that one has to pay to the government.

medicine - something given to sick people to make them better.

General Information

IT IS IMPERATIVE THAT THE CHILDREN UNDERSTAND THE COMPLEX CONCEPT OF TAXATION SO THAT THEY CAN UNDERSTAND THE INDIRECT COSTS OF POLLUTION.

Higher taxes for road repair, water treatment, air pollution control, cleaning up litter and chemical spills, and refuse disposal are responsible for dollars taken out of the family budget in the form of taxes.

A direct cost of pollution may come through increased medical and hospital bills. Food prices are also higher because of pollution. The U.S. annual crop damage from pollution is $500 million.

Unfortunately, pollution costs are borne more heavily by lower income groups. These people tend to live in cities where the dangers from pollution are also the greatest. The increased costs of products reflect the companies' expenses for fighting pollution and for getting rid of wastes. These increased costs take a larger percentage of the income from the poor than from the wealthy. Many people feel that a greater redistribution of wealth must be commensurate with environmental control.

A way to dramatize increased taxation because of pollution problems would be to demonstrate how a child's allowance could be decreased in inverse proportion to increased mill rates.

Answers

All the money should be colored green.

JELLY JAM REVIEW

ACTIVITY BOOK PAGES 58 AND 59

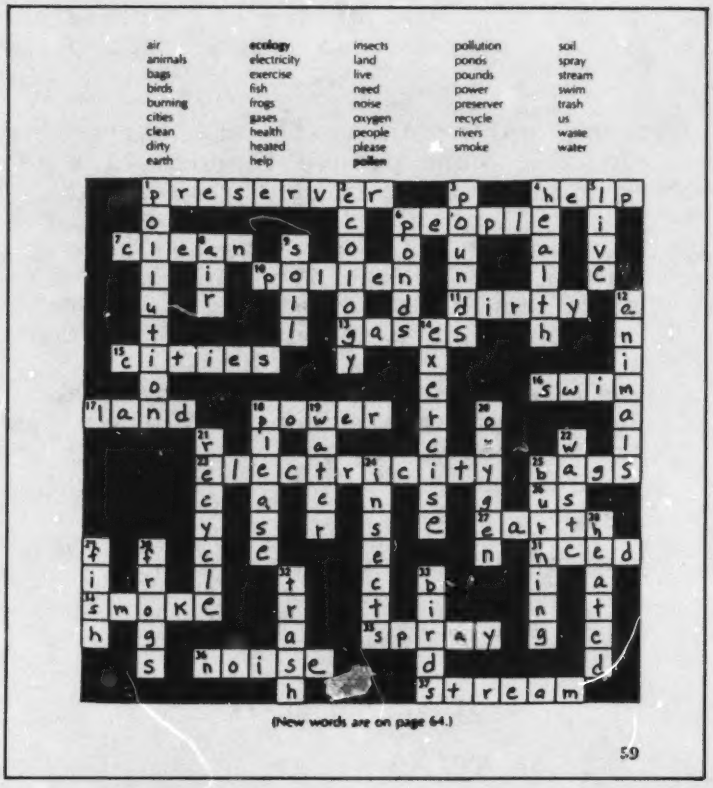
Words to Introduce

ecology - learning about living things and how they act with what is around them.

pollen - a fine yellow dust found in flowers.

Answers

Page 58 gives clues for the words on the top of page 59.



air
animals
bags
birds
burning
cities
clean
dirty
earth

ecology
electricity
exercise
fish
frogs
gases
health
heated
help

insects
land
live
need
noise
oxygen
people
please
pollen

pollution
ponds
pounds
power
preserver
recycle
rivers
smoke

soil
spray
stream
swim
trash
us
waste
water

(New words are on page 64.)

59

ACTIVITY BOOK PAGE 60

Answer

The secret code should spell out . . . WHAT ARE YOU DOING TO HELP PRESERVE OUR ENVIRONMENT?

ACTIVITY BOOK PAGE 61

Answer

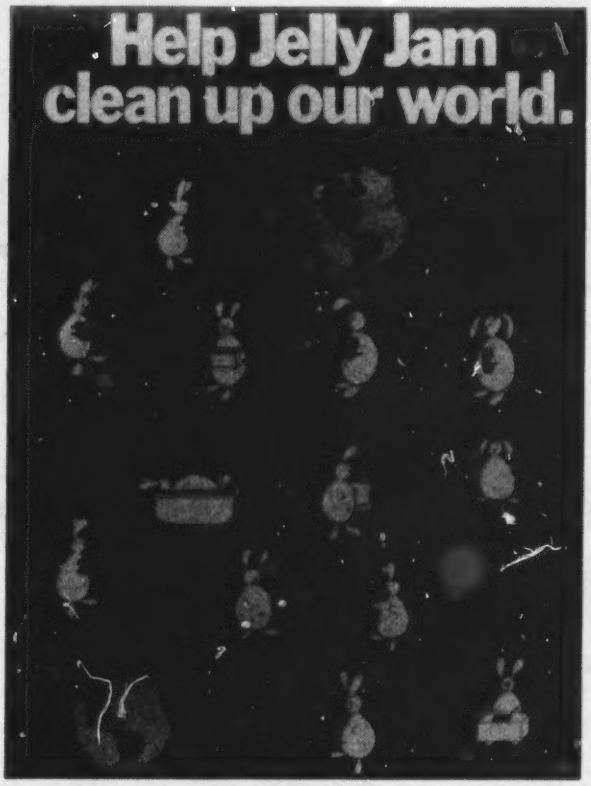
CONCLUSION

General Information

The study you have undertaken is an immediate and poignant one for all of us. Man's history is over a million years old. His future may now be measured in terms of decades. THE NEXT TWO OR THREE DECADES MAY TELL THE STORY. You are teaching the leaders and the citizens of the next two or three decades.

Put up Poster 8.

It reviews all the things that children can do to help their environment.



Activity (social studies)

Review the Jelly Jam concepts by creating a new society in miniature.

Cover a very large table with wrapping or shelf paper. (A large sand table filled with sand and dirt is also effective.)

Make a small city "plan." Discuss the geography of the area to determine its safe, renewable energy sources. Energy could come from forms of solar and wind power, hydropower, geothermal energy and/or firewood.

Plan roads for bicycles and pedal-powered vehicles.

Be sure all the buildings have sun access spaces and do not shade one another.

All planting should be useful--edible, or its end products should be able to be used for clothing, shelter, or other human needs.

Ring the city with small, sustainable organic farms. Use windmills for drawing water from the ground. Water should also be collected from rooftops and stored in underground cisterns.

The farms should use alcohol-powered tractors and have mobile solar housing for chickens and pigs.

Areas should be available for ponds for raising fish and hydroponic vegetables and tree farms for raising fuel and lumber products.

Attractive, low, small factories should dot the landscape. They would produce local products used for shelter, food, clothing, furniture, and other human needs.

For suggestions on creating a new decentralized society, write:

The New Alchemy Institute
237 Hatchville Road
East Falmouth, MA 02536.

Books for Primary Grades

Gates, R., True Book of Conservation, New York: Children's Press, 1959. (This small, readable book contains large print and interesting photographs.)

Hurd, Edith Thacher, Wilson's World, New York: Harper and Row, 1971. (This fictional story describes a little boy's concept of a better world.)

Books for Intermediate Grades

Bixby, William, A World You Can Live In, New York: David McKay Co., 1971, p. 117-126.

Gabel, Margaret, Sparrows Don't Drop Candy Wrappers, New York: Dodd, Mead & Co., 1971. (This humorous, commonsense book gives hundreds of suggestions that children can apply to cleaning up the earth.)

Graham, Frank and Ada, The Careless Animal, New York: Doubleday and Co., 1975. (Nine ecological detective stories are described.)

It's Your Environment: Things to Think About, Things to Do, New York: Charles Scribner's Sons, 1976. (This book contains hundreds of delightful experiments and projects.)

Miles, Betty, Save the Earth! An Ecology Handbook for Kids, New York: Alfred Knopf, 1974. (This lively book describes hundreds of ecological projects about land, air, and water pollution.)

Books for Adults

The Journal of the New Alchemists - 7, The New Alchemy Institute, Brattleboro, Vermont: The Stephen Green Press, 1981. (Pages 133-174 provide exciting reading about "The Village as Solar Ecology." An uplifting, practical description of how we could live.)

Lappe, Francis Moore, Diet for a Small Planet, New York: Ballantine Books, 1978. (This fascinating paperback describes how to obtain vitamins, minerals, and protein from vegetables which, in turn, helps to combat world hunger and provide a healthier lifestyle.)

Leopold, Aldo, Sand County Almanac, New York: Oxford Press, 1949. (This readable classic is a beautiful study of a conservation philosophy.)

Schumacher, E.F., Small is Beautiful, New York: Harper and Row, 1975. (This guide to sane economics details a new, more manageable way of life--blending appropriate technology and human needs.)

Posters for Adults and Children

Delightful utopian suburban and urban scenes can be ordered from:

RAIN - The Journal of Appropriate Technology
2270 N.W. Irving
Portland, OR 97210.

JELLY JAM RECOMMENDED MATERIALS FOR CHILDREN AND ADULTS

BOOKS FOR PRIMARY GRADES

Air Pollution

Gutnik, Martin, Ecology and Pollution/Air, Chicago: Children's Press, 1973.

Perera, Thomas and Gretchen, Louder and Louder: The Dangers of Noise Pollution, New York: Franklin Watts, Inc., 1973.

Energy

Berger, Melvin, Energy From the Sun, New York: T.Y. Crowell Co., 1976.

Population

Burton, Virginia, The Little House, New York: Houghton-Mifflin Co., 1978.

Ross, Pat, What Ever Happened to the Baxter Place?, New York: Pantheon Books, 1976.

Water

Freeman, Don, Seal and the Slick, New York: Viking Press, 1974.

Gans, Roma, Water for Dinosaurs and You, New York: T.Y. Crowell & Co., 1972.

Gutnik, Martin, Ecology and Pollution/Water, Chicago: Children's Press, 1973.

Orlowsky, Wallace, and Thomas Perera, Who Will Wash the River?, New York: Coward-McCann, Inc., 1970.

Simon, Seymour, Water on Your Street, New York: Holiday House, 1974.

Land

George, Jean, Hole in the Tree, New York: C.P. Dutton, 1957.

Gutnik, Martin, Ecology and Pollution/Land, Chicago: Children's Press, 1973.

Silverstein, Shel, The Giving Tree, New York: Harper and Row, 1964.

Recycling

Lefkowitz, R.J., Save It! Keep It! Use It Again, New York: Parents' Magazine Press, 1977.

Shanks, Ann Zane, About Garbage and Stuff, New York: The Viking Press, 1973.

General Information

Gates, R., True Book of Conservation, New York: Children's Press, 1959.

Hurd, Edith Thacher, Wilson's World, New York: Harper & Row, 1971.

Peet, Bill, The Wump World, Boston: Houghton-Mifflin Co., 1970.

Seuss, Dr., The Lorax, New York: Random House, 1971.

BOOKS FOR INTERMEDIATE GRADES

The Environment

Adler, Irving, The Environment, New York: The John Day Co., 1976.

Air Pollution

Elliott, Sarah, Our Dirty Air, New York: Julian Messner, 1971.

Energy

Hoke, John, Solar Energy, New York: Franklin Watts, Inc., 1978.

Pringle, Laurence, Nuclear Power: From Physics to Politics, New York: Macmillan Publishing Co., 1979.

Smith, Norman, Wind Power, New York: Coward, McCann & Geoghegan, Inc., 1981.

Spooner, Maggie, Sunpower Experiments: Solar Energy Explained, New York: Sterling Publishing Co., Inc., 1980.

Pesticides

George, Jean, Who Really Killed Cock Robin?, New York: E.P. Dutton, 1971.

Water

Berger, Melvin, The New Water Book, New York: Thomas Y. Crowell Co., 1973.

Carlson, Carl Walter, Water Fit to Use, New York: The John Day Co., 1966.

Kalina, Sigmund, Three Drops of Water, New York: Lathrop, Lee and Shepard Co., 1974.

Pringle, Laurence, Water: The Next Great Resource Battle, New York: Macmillan Publishing Co., Inc., 1982.

Land

Elliott, Sarah, Our Dirty Land, New York: Julian Messner, 1976.

Jaspersohn, William, How the Forest Grew, New York: Greenwillow Books, 1980.

Pringle, Laurence, Wild Foods, New York: Four Winds Press, 1978.

Recycling

Rencyclopedia, The, New York: Houghton-Mifflin Co., 1976.

Shanks, Ann Zane, About Garbage and Stuff, New York: The Viking Press, 1973.

Conservation

Friedman, Judi, Puffin, Come Back!, New York: Dodd, Mead & Co., 1981.

Gabel, Margaret, Sparrows Don't Drop Candy Wrappers, New York: Dodd, Mead & Co., 1971.

General Information

Bixby, William, A World You Can Live In, New York: David McKay Co., Inc., 1971.

Breiter, Herta, Pollution, Milwaukee: Raintree Children's Books, 1978.

Duffey, Eric, Conservation of Nature, New York: McGraw-Hill, 1970.

Graham, Frank and Ada, The Careless Animal, New York: Doubleday, 1975.

Hoke, John, Ecology: Man's Effects on His Environment and Its Mechanisms, New York: Franklin Watts, Inc., 1971.

It's Your Environment: Things to Think About, Things to Do, New York: Charles Scribner's Sons, 1976.

Miles, Betty, Save the Earth! An Ecology Handbook for Kids, New York: Alfred Knopf, 1974.

Pringle, Laurence, Lives at Stake, The Science and Politics of Environmental Health, New York: Macmillan Publishing Co., 1980.

Note: Lerner Publications in Minneapolis, Minnesota, publishes an excellent comprehensive series on the pollution of water, air, land, noise, food, and population for intermediate grade readers.

BOOKS FOR ADULTS

Energy

Butti, Ken, and John Perlin, A Golden Thread--2500 Years of Solar Architecture and Technology, New York: Van Nostrand Reinhold Co., 1980.

Gofman, John, Radiation and Human Health, San Francisco: Sierra Club Books, 1981.

Pesticides

Carson, Rachel, Silent Spring, New York: Houghton-Mifflin, 1962.

Commoner, Barry, The Closing Circle, New York: Knopf, 1971.

Organic Plant Protection, Roger B. Yepsen, Jr., ed., Emmaus, Pennsylvania: Rodale Press, Inc., 1976.

Land

Berry, Wendell, The Unsettling of America: Culture and Agriculture, San Francisco: Sierra Club Books, 1977.

Creasy, Rosalind, The Complete Book of Edible Landscaping, San Francisco: Sierra Club Books, 1982.

Recycling

Rencyclopedia, The, New York: Houghton-Mifflin Co., 1976.

Conservation

Dadd, Debra Lynn, A Consumer Guide for the Chemically Sensitive, San Francisco: Nontoxic Lifestyles, Inc., 1982.

Ecology at Home, San Francisco: 101 Productions, Inc., 1971. (79 Liberty Street)

Household Pollutants Guide, The, Albert Fritsch, ed., New York: Anchor Press/Doubleday, 1978.

How To Manage Your Company Ecologically, Jerome Goldstein, ed., Emmaus, Pennsylvania: Rodale Press, 1971.

Lappe, Francis Moore, Diet for a Small Planet, New York: Ballantine Books, 1978.

Natural Formula Book for Home and Yard, Don Wallace, ed., Emmaus, Pennsylvania: Rodale Press, 1982.

Schumacher, E.F., Small Is Beautiful, New York: Harper & Row, 1975.

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Bixby, William, A World You Can Live In, New York: David McKay Co., 1971.

Carnegie, Dale, Effective Speaking, New York: Association Press, 1972.

Croall, Stephen, Ecology for Beginners, New York: Random House, Inc., 1982.

Leopold, Aldo, Sand County Almanac, New York: Oxford Press, 1949.

Link, Michael, Outdoor Education, New Jersey: Prentice-Hall, Inc., 1981.

Schell, Jonathan, The Fate of the Earth, New York: Alfred Knopf, 1982.

Teale, Edwin Way, A Walk Through the Year, New York: Dodd, Mead and Co., 1978.

ENVIRONMENTAL PERIODICALS FOR CHILDREN

The Dolphin Log. Cousteau Society, Box 2002, Grand Central Station, New York, NY 10164. By obtaining a family membership in the Cousteau Society, one will receive this fascinating children's magazine.

Ranger Rick. National Wildlife Federation, 1412 16th Street, N.W., Washington, DC 20036. Grades 2 through 6 will find this magazine fascinating.

ENVIRONMENTAL PERIODICALS FOR ADULTS

Audubon. 950 Third Avenue, New York, NY 10022. This sophisticated publication of the National Audubon Society contains beautiful photographs, in-depth articles, news, and action alerts on a variety of environmental subjects.

Environmental Action. 1346 Connecticut Avenue, N.W., Washington, DC 20036. This action-oriented magazine deals with the latest news coverage on environmental issues.

Mother Earth News. 105 Stoney Mountain Road, Hendersonville, NC 28791. This "homespun," delightful, colorful environmental magazine is for "do-it-yourselfers."

SOURCE OF MATERIALS FOR ADULTS AND CHILDREN

Energy Catalog. Environmental Action Resource Service, Box 8, Farisita, CO 81037. This fascinating catalog lists new books, posters, magazines, and other materials on all types of alternative energy and conservation issues.

MATERIALS FOR CHILDREN

"Audubon Bird Call." The $4 bird call can be ordered from Roger Eddy, P.O. Box 11172, Newington, CT 06111. Use it outdoors to imitate various bird sounds.

"Connections: A Curriculum in Appropriate Technology for 5th and 6th Graders." Order from the National Center for Appropriate Technology, Butte, Montana, for $5.

"Eco Cards." These role-playing ideas for intermediate grade children can be ordered from The National Association for Humane Education, Box 362, East Haddam, CT 06423.

"Sunpower House." Order from Crystal Productions, Box 12317, Aspen, CO 81612. This cardboard house is a working, three-dimensional model of a passive solar home.

FILMS FOR CHILDREN

The Floodwatcher. Rodale Press. Available from Bullfrog Films, Oley, PA 19547. (This short film is an ecological skit for grades 3 through 9.)

Organic Gardening: Composting. Rodale Press. Also available from Bullfrog Films. (This is a short demonstration film for grades 3 to adult.)

Pedal Power. Same as above. (This film demonstrates how an old bicycle can be modified to perform a variety of tasks.)

SLIDE SETS AND FILMSTRIPS FOR CHILDREN

A variety of fine nature productions is available from Educational Images, P.O. Box 367, Lyons Falls, NY 13368.

RECORDS FOR CHILDREN

Banks of Marble. Pete Seeger. Folkways Records. (Folksongs such as "Don't Ask What a River Is For," "God Bless the Grass," "Garbage" are included.)

Callings and Common Ground. Paul Winter. Living Music Records, Box 72, Litchfield, CT 06759. (These records include "Wolf Eyes," "Ocean Dream," and "Common Ground." Paul Winter mixes music and animal sounds.)

Field Guide to Bird Songs. Laboratory of Ornithology, Cornell University, Ithaca, NY. (The actual recordings of common birds are featured in these records.)

Four Seasons. Vivaldi. (This recording glorifies the wonders of nature. Children can paint impressionistically, interpreting the seasons as the music plays.)

Grand Canyon Suite, The. Grofe. (The grandeur of a famous natural wonder is emphasized. Show pictures of the Grand Canyon before the children listen to a good symphonic rendition.)

Language and Music of the Wolves, The. Robert Redford and actual wolf sounds. Columbia Records. (This fascinating album tells about the history and life of the endangered wolf.)

Song of the Humpbacked Whale. Roger Caras. Capital Records, Inc.

ACTIVE ENVIRONMENTAL ORGANIZATIONS

Children's Campaign for Nuclear Disarmament
14 Everit Street
New Haven, CT 06511

Defenders of Wildlife
1244 19th Street, N.W.
Washington, DC 20036

Educators for Social Responsibility
639 Massachusetts Avenue
Cambridge, MA 02139

Environmental Action, Suite 731
1346 Connecticut Avenue, N.W.
Washington, DC 20036

Environmental Defense Fund
444 Park Avenue South
New York, NY 10016

Friends of the Earth
1045 Sansome Street, Suite 404
San Francisco, CA 94111

National Audubon Society, The
950 Third Avenue
New York, NY 10022

National Resources Defense Council
122 East 42nd Street
New York, NY 10168

National Wildlife Federation
1412 16th Street, N.W.
Washington, DC 20036

Sane World
711 G Street, S.E.
Washington, DC 20003

Sierra Club
530 Bush Street
San Francisco, CA 94108

Solar Lobby, Suite 510
1001 Connecticut Avenue, N.W.
Washington, DC 20036

Wilderness Society
1901 Pennsylvania Avenue, N.W.
Washington, DC 20006

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Brown, Lester, "Soils and Civilizations," Audubon, January, 1982, p. 18.

Brown, Michael, "Drums of Death," Audubon, July, 1980, p. 120-133.

"Creatures," Audubon, September, 1980, p. 20.

Croall, Stephen, and William Rankin, Ecology for Beginners, New York: Pantheon Books, 1982.

Do It Yourself Air Pollution Control, Hartford: Hartford County Area T-R Disease Association, Inc.

Ehrlich, Paul and Anne, "Why Butterflies?", Amicus Journal, Spring, 1981, p. 16.

Exposure, Environmental Action Foundation, December, 1981, Washington, D.C.

"Guarding Our Ground Water," Connecticut Audubon Report, July, 1981.

Journal of the New Alchemists - 7, The New Alchemy Institute, Brattleboro, Vermont: The Stephen Green Press, 1980.

Leopold, Luna B., and Kenneth S. David, Water, New York: Time-Life Books, 1968.

Link, Michael, Outdoor Education, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1981.

Luoma, John, "The $33 Billion Misunderstanding," Audubon, November, 1981, p. 110-127.

McGavack, John, Jr., and Donald P. LaSalle, Crystals, Insects, and Unknown Objects, New York: The John Day Co., 1971.

McGavack, John, Jr., and Donald P. LaSalle, Guppies, Bubbles, and Vibrating Objects, New York: The John Day Co., 1969.

Needed: Clean Air, Greenfield, Massachusetts: Channing L. Bete Co., Inc.

Not Man Apart, Friends of Earth, March, 1981.

"Schools Eliminate Toxic Art Supplies," Hartford Courant, February 19, 1983.

Terres, John K, The Audubon Society Encyclopedia of North American Birds, New York, Alfred Knopf, 1980, p. 292-293.

"They Kill Mice, Don't They?", The Progressive, February, 1982.

Touch the Earth, T.C. McLuhan, ed., New York: Simon and Schuster, 1971.

Wagener, Karl, "Guarding Our Ground Water," Connecticut Audubon Report, July, 1981.

Webster's Seventh New Collegiate Dictionary, Springfield, Massachusetts: G. & C. Merriam Company, 1963.

Young, Gordon, "Pollution, Threat to Man's Only Home," National Geographic, December, 1970, p. 738-781, Washington, D.C.: National Geographic Society.

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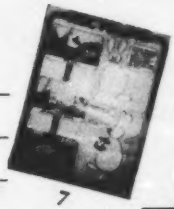
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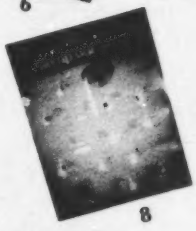
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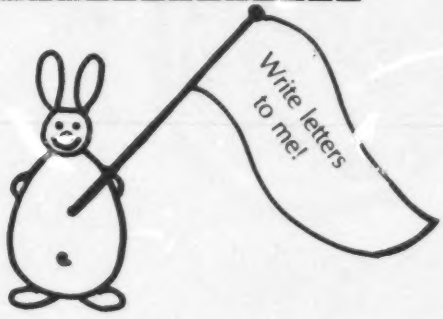

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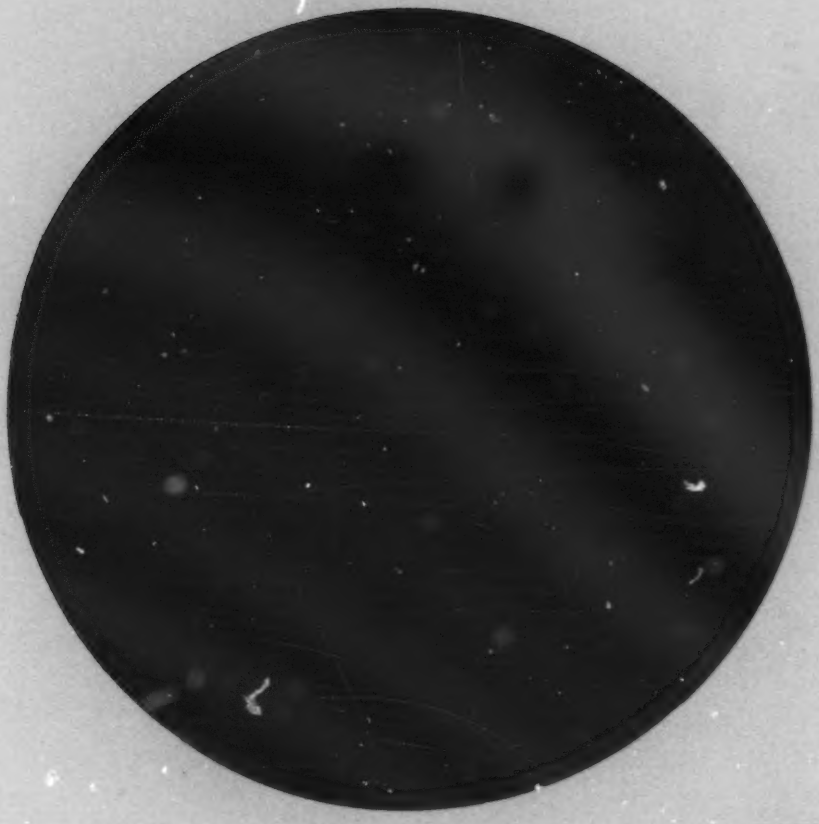

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